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DATE: June 26, 2009

TO: Gary Newhart, U.S. EPA/ERTC Work Assignment Manager

THROUGH: Dennis Miller, REAC Operations Section Leader *D. Miller*

FROM: Christopher Gussman, REAC Task Leader *Chris Gussman*

SUBJECT: PILOT STUDY COMMENCEMENT MAY 2009
LOWER SILVER CREEK TAILINGS SITE
WORK ASSIGNMENT No. 0-300
TRIP REPORT

Introduction

This trip report summarizes the start up of a pilot scale study at the Lower Silver Creek Tailings Site initiated on May 11, 2009. In November of 2008, Lockheed Martin Response Engineering Analytical Contract (REAC) personnel were tasked to chemically and agriculturally characterize soil provided from the site. Part of this evaluation was to determine the effect of a locally available biosolids compost source on the soil chemistry and plant growth in these soils. Contaminated soil (tailings) cover a large area of the site, and an effective way to revegetate the area and/or bind metals of interest would be more economic than removal. The current goal is to observe the effects of these amendment in the field *in situ*, and to compare different amendments and amendment application rates on the growth and long term establishment of native vegetation.

REAC personnel, the U.S. Environmental Protection Agency (U.S.EPA) Work Assignment Management (WAM), and a representative of the U.S. Fish and Wildlife Service, under guidance of Region VIII EPA, initiated the pilot scale trial on May 11, 2009. An area of tailings typical of the area was selected, and a 75 feet by 100 feet pilot study area was created. This pilot study area was divided into fifteen 25 feet by 20 feet subplots allowing five treatments placed by a complete randomized block design with three replications.

Background

From the mid-1800s through the 1970s, this region was extensively mined for silver and lead ores. Although some remediation has occurred, residual deposits of tailing wastes remain in place along large sections of the Lower Silver Creek. Bed sediment samples were collected by the USGS in 1998, 1999, and 2000 and analyzed. Water samples were collected in March and August 2000 and were analyzed for total and dissolved trace metals.

* Concentrations of silver, cadmium (Cd), copper (Cu), lead (Pb), mercury (Hg), and zinc (Zn) in the streambed sediment of Silver Creek greatly exceeded background concentrations. The levels of these metals also exceeded established aquatic life criteria at most sites. In the Weber River, downstream of the confluence with Silver Creek, concentrations of Cd, Pb, Zn, and total Hg in streambed sediment also exceeded aquatic life guidelines, however, concentrations of metals in streambed sediment of McLeod and Kimball Creeks were lower than Silver Creek. Water-column sampling showed concentrations of Zn, total Hg, and methylmercury in Silver Creek were high relative to unimpacted sites, and exceeded water quality criteria for the protection of aquatic organisms. Qualitative measurements of the macroinvertebrate community in Silver Creek were compared to the spatial distribution of metals in streambed sediment. The data indicate

that impairment related to metal concentration exists in Silver Creek.

The Lower Silver Creek Tailings Site extends over 12 miles along the banks of Silver Creek, from State Route 248 north of Richardson Flat, two miles east of Park City, Summit County, Utah. The site has been subdivided into southern and northern portions, due to the site conditions and topography. The northern portion of the site consists of a narrow corridor located between the lanes of interstate 80 (I-80) which includes the rail trail, Silver Creek and the riparian habitat. The southern portion of the site is approximately 4.4 miles in length between Atkinson and State Route 248, and is as much as 2,500 wide, east to west. The southern portion of the site upstream from Atkinson is being developed by residential and commercial expansion.

The headwaters of Silver Creek are located upgradient of Park City. Silver Creek is the primary drainage within the watershed downstream to the Weber River confluence in Wanship, Utah. The Weber River is considered a Class 4 (agricultural), 3A (cold water fishery), 2B (contact recreation), 1C (source of drinking water) river. Silver Creek is considered a Class 3A, 1C and 4 stream.

Mine tailings generally cover the entire southern portion of the Lower Silver Creek. Tailings are readily apparent in the non-vegetated gray colored sandy and gravelly mounds and low ridges within the riparian habitat along Silver Creek. Elongated berms trend north-south and are found throughout the entire southern portion of the Lower Silver Creek.

The northern portion of the Lower Silver Creek is a generally well vegetated riparian habitat. A beaver dam was observed upstream from Alexander Canyon. Fish were observed in Silver Creek at a few locations. Various bird species have been reported along the banks of the Silver Creek. Mine tailings have reportedly not been observed more than one mile north and downstream of Atkinson.

The area impacted by this site is too large for conventional treatment such as removal. It is anticipated that compost and possibly other soil amendments may be utilized to enhance vegetative cover establishment at the site and possibly reduce mobility of the metal contaminants. In January 2008, REAC scientists performed a laboratory test to examine growth of plants and metal concentration on four soil samples obtained from lower silver creek. The studies indicated that the plant growth was problematic but plant health and vitality were improved with supplemental compost and phosphorus. The next step was to create a pilot scale revegetation effort on the tailings *in situ*. Plant growth and species diversity could then be observed under natural site conditions and any potential problems identified and corrected before going full scale. Additional data, such as metal mobility and carbon sequestration rates may also be obtained from these pilot plots at a future date.

Activities

REAC personnel arrived at the site the afternoon of Monday, May 11th, 2009. The site is large and there are multiple property owners. The area of interest is within parcel boundary "SS-44", just north of Lower Silver Creek Road and east of Lower Silver Creek. It is also west of the rail trail. A public parking lot and public rest room exist just east of the rail trail, and a Fire Station is just south of the parking lot on the other (south) side of Lower Silver Creek Road. A delivery of 15 cubic yards of biosolids compost was scheduled from Central Valley Water Reclamation (800 West Central Valley Road/ Salt lake City, UT 84119). The driver arrived about the same time as the REAC personnel. As the actual location of the plots had not yet been determined, arrangement was made to deliver the compost at the back (north) end of the public parking lot. REAC personnel also contacted Mr. Kerry Gee, Vice President of United Park City Mines, who is familiar with the site and offered to provide additional, vegetation-based compost as well as a general knowledge of the area and other assistance. It was arranged to meet Kerry Gee the first thing the following morning.

On the morning of Tuesday, May 12th, REAC and Fish and Wildlife personnel met with Mr. Kerry Gee. Mr. Gee was actively involved in restoration work on tailings south of the area of interest for the pilot. Mr. Gee showed the results of a large scale and well thought out ongoing restoration effort where mine tailings had been remediated and the area restored to vegetated upland areas bordering open water including ponds and berms for wildlife. Numerous waterfowl could be seen in and around these bodies of water. Afterwards Mr. Gee took us to see various large scale compost piles

on the property, and he agreed to deliver approximately 6 cubic yards of compost derived from various tree branches, leaves, and other vegetation. REAC personnel then returned to the pilot area and placed pin flags out to roughly define the pilot area. Mr. Gee and an employee soon showed up at the site. Mr. Gee indicated that our potential pilot area was more likely on SS-44B. SS-44B is private property and permission was not granted by the owner to be on this property. He suggested we move slightly west, closer to the creek, in an area that was part of SS-44 where permission of access had been granted. Much of this area was fairly moist, being close to the creek and relatively flat. The area was certainly effected by mine tailings which were visible through the sparse but regular cover of wiregrass (*Juncus balticus*). Some areas of barren, unvegetated tailings are visible on this property, just slightly north, but access to this area was difficult due to distance from the road and interception by a drainage channel (with water) between the road and the barren area. A section of the barbed wire fence bordering the property along the road had been previously cut and this section was easy to open for access. A new 3 feet by 100 feet plot area was created (Figure 1). Due to logistical issues this plot was placed fairly close to the road but at a location very typical of much of the area. The "leaf compost" was delivered directly adjacent to the plot. Mr. Gee also kindly provided the personnel and equipment to move the biosolids compost from the public parking lot to a location next to the road adjacent to the opening in the fence. Mr. Gee also provided a small bulldozer and operator. It was hoped that this bulldozer could be used to scrape the wiregrass off the surface of the plot and to roughen and mix the surface soil layer. This method proved to be ineffective and it was soon abandoned. Instead a rototiller was rented from a nearby tool rental shop (Diamond Rental) and used to till in the wiregrass and to loosen and mix the surface soil. This proved quite effective. The borders of the plots were measured and defined by flagging, wooden stakes and thin rope. The EPA/ERT WAM arrived and was satisfied with the progress and the location of the pilot.

On Wednesday, May 13th REAC, Fish and Wildlife, and ERT personnel returned to the plots. Treatments were randomly distributed on paper ahead of time (Figure 2). Treatment consisted of a control=A (no organic amendment), B= 10 percent (%) biosolids compost, C=20% biosolids compost, D= 10% Leaf Compost, and E= 10% Biosolids Compost and 10% leaf compost. Percentages are based on the top six inches of soil and a 10% compost rate equals approximately one cubic yard of compost per 20 feet by 25 feet plot. All of the plots received supplemental phosphorus at the rate of just over one pound of phosphorus per 500 square foot plot. The phosphorus was applied primarily as Super Triple Phosphate but a small amount of bone meal was also utilized. The treatment for each plot was marked on a pin flag and the appropriate amount and type of compost was brought to each plot using a shovel, wheelbarrow and buckets.

A
B
C
D
E

Small 10 feet by 10 feet plots, of identical treatment but without replication were set up slightly north in a barren area of tailings with no vegetative growth. This is indicated on Figure 1 as the "Small Plot Area". Although not replicated, these plots were created to see if these barren tailings, representing a "worst case" scenario, would support plant growth after seeding and organic amendment. The surface soil (tailings) at this location was very coarse and sandy, and disturbance of the surface revealed unusual orange and yellow staining. The small plots in the barren area were labeled A4 through E4. A small garden rototiller was rented and used to thoroughly mix the amendments and native soil/tailings (Figure 3). Bales of certified weed-free straw were purchased from a local farmer and delivered to the plot. The straw provides a mulch to protect the seeds and seedlings from desiccation during germination and initial growth.

On Thursday, May 14th, 2009, the plots were seeded using a combination of four different seed mixtures plus a sterile wheat (used as a nurse crop) purchased from Western Native Seed (Colorado). The seed utilized was a 8:1:2:1 mixture of "Sage Country Meadow Mix", "High Altitude Meadow Mix", "Montane Meadow Mix", and "Mountain Wet Meadow Mixture". The composition of these respective seed mixtures is listed in Appendix A. Another 20% (weight) of sterile wheat was added to this as a nurse crop. Multiple seed mixtures were used to provide the greatest diversity possible. The "Sage Country Meadow Mix" dominated the mixture as this was the most appropriate for the Park City, Utah area. After visiting the site, and seeing its proximity to the flood plain, an increase in the amount of "Mountain Wet Meadow Mixture may have been more appropriate for this site. However, the diversity of the mixture of species seeded should help ensure revegetation success. Approximately 0.75 pounds (equivalent to 1.5 pounds per 1000 square feet) of seed was applied by hand and evenly distributed on the surface of each plot. After seeding, a rented agricultural, hand-pulled

roller was used to press the seed into the soil, providing good seed to soil contact. Afterwards the bales of straw were broken apart by hand and the straw was evenly distributed on the plot, approximately 1.5 bales straw per plot.

The perimeter of the 75 feet by 100 feet plot and the perimeter of the smaller 10 feet x 50 feet plot (on the barren tailings) were fenced to help minimize disturbance of the plots from humans and grazing cattle. A four foot tall wire fence was secured to metal stakes driven into the ground as needed to support the fencing (Figures 4 and 5). An effort was also made to bury the bottom of the fencing in the surface soil.

Leftover biosolids compost by the road was distributed into wheel ruts and throughout the roadside. Some leftover leaf compost was left on Site, in a pile beside the larger plot. The leaf compost had a lot of larger material in it, such as small logs while the bulk of the material was well broken down. All personnel departed from the Site on May 15, 2009.

Soil Analysis

Soil was collected from each of the 15 test plots. A subset of each soil sample was sent to the ERT/ REAC Laboratory for TAL metals analysis (including Hg) and a subsample was sent to Rutgers University Soil Laboratory for agricultural soil fertility testing (Appendix C). In addition, a soil sample from the barren tailings (A4) and samples of the "biosolids compost" and "leaf compost" were also analyzed. The soil from each plot was a composite of five points and the composite was thoroughly mixed by hand. Large stones, sticks, etc. were removed from the soil and discarded.

The analytical results from the ERT REAC Laboratory for metals in the soil samples may be found in Appendix B. Metals of concern were high in the soils, particularly Zn, Pb and Cu. Zinc, in particular, was found at levels up to 3%, with the average in the unamended control soils (A1, A2, and A3) containing 23,266 mg/kg of zinc. Copper in the control soil averaged 347 mg/kg, and Pb averaged 4,380 mg/kg. Copper and Zn in the biosolids compost was relatively high also at 577 and 957 mg/kg respectively. Levels of these two metals were low in the leaf compost, 31 mg/kg Cu and 204 mg/kg Zn. Treatment E (10% biosolids compost plus 10% leaf compost) had the lowest Cu and Zn averages for the three samples at 208 mg/kg and 13,800 mg/kg Cu and Zn respectively. The unvegetated area, A4, contained relatively high levels of metals. Copper was found to be 577 mg/kg and zinc was 28,400 mg/kg. Although high, these levels of metals were not higher than levels found within the main plot, and lead was only at 60.3 mg/kg in this sample.

Zn
Pb
Cu
Zn

The pH of the soils was at or slightly above neutral for all of the site soils. The pH averaged about 7.29 for treatment E to 7.57 for A (unamended controls). The pH of the biosolids compost is lower than the plot soil, at 5.7, but the leaf compost pH 7.20.

Electrical conductivity (EC) was found to be high in all soil samples which may burn the roots of many plant species. The average EC was lowest for treatment D (+10% leaf compost) at 2.12 milliohms per centimeter (mmho/cm). Electrical conductivity averaged 3.19 mmho/cm in the unamended control (treatment A), and 3.26 mmho/cm in treatment C (+ 20% biosolids compost). The biosolids compost was found to have a very high soluble salt level of 10.81 mmho/cm, whereas the leaf compost was only 2.20 mmho/cm, optimal for organic media.

Fertilizing the plots with supplemental P resulted in adequate or above adequate P levels in the soils. Micro nutrients like Zn and Cu, were extremely high and may cause plant toxicity. The soils were all identified as Sandy Loams.

Organic matter was adequate or high in all of the plots. Untreated control plots (A1 to A3) average 9.4% organic matter (5.44% C). The highest amendment applications, treatments C and E, averaged 22% and 26% organic matter respectively (17.7% and 15.1% carbon respectively).

The two organic amendments are characteristically different which allows for good comparison. The biosolids compost has a lower pH, higher organic content, and much higher electrical conductivity and nitrogen content than the leaf compost.

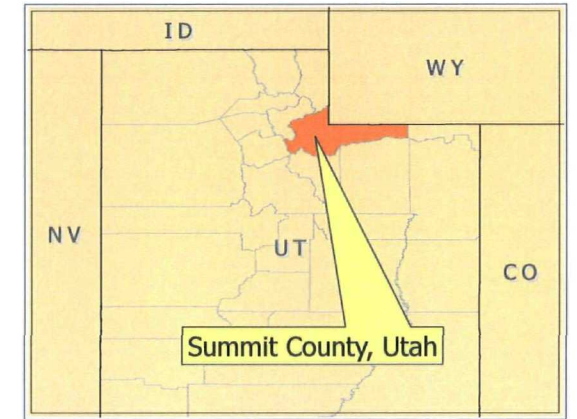
Based on the analytical results, the unvegetated tailings do not seem to be greatly different from the main plot except in their lower organic matter content. This organic matter may be assisting in binding toxic metals as well as holding in moisture, resulting in establishment and growth of at least one species of plant (Baltic Rush).

Future Activities

Future activities will evaluate the success of the pilot scale study and information. It is anticipated that a trip will be made to observe the site in July 2009 to check on the seed germination and overall condition of the plot. General differences in response to amendment treatments will be noted.

A more formal evaluation will be made at the end of the growing season, examining in detail the plant species composition, plant health, and percent plant cover. Additional effort will most likely occur examining the metal mobility and carbon sequestration rates.

Figures



Map created using 2006 high resolution color orthophotography from SGID, site survey GPS data.

Map Creation Date: 15 June 2009

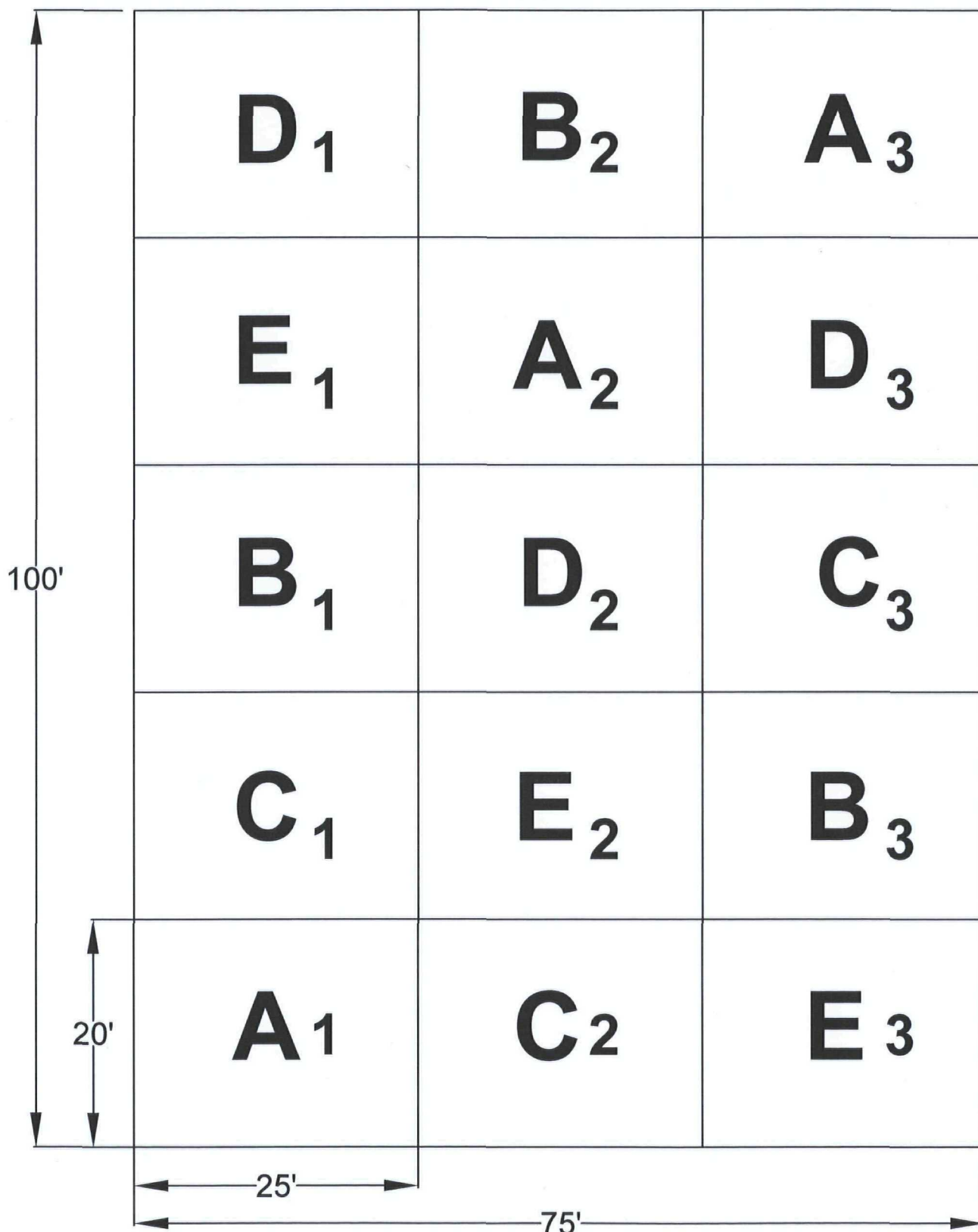
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 FIPS: 4301
 Datum: NAD83
 Units: Feet



Data: g:\arcviewprojects\reac4\00-300
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 Revision Number: 001

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Figure 1
 Site Location
 Lower Silver Creek Tailings Site
 Park City, Utah
 June, 2009



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FIGURE 2
 LOWER SILVER CREEK TAILING SITE
 PILOT STUDY
 MAY 2009

Summary of metals of interest within the Lower Silver Creek

	A1	B1	C1	D1	E1	A2	B2	C2	D2	D2 b	E2	A3	B3	C3	D3	B3 b	E3	A4	BioComp	LeafComp
Arsenic	315	233	263	245	179	124	200	48.4	38.9	139	18.8	182	196	147	175	242	64.3	380	12.6	8.87
copper	524	433	556	418	347	198	372	362	80.3	244	91.5	318	360	361	239	442	186	543	577	31
lead	7430	4650	6240	4870	3460	2610	4120	863	791	2980	278	4450	3890	2790	3520	5720	1680	8510	60.3	103
sodium	730	545	806	413	480	2410	476	1570	768	889	1030	677	940	688	1240	899	1100	853	1320	262
zinc	30300	15700	16400	18500	13700	23600	13000	18600	7600	18200	10600	15900	20300	9560	14900	19500	17100	28400	957	204

	A1	A2	A3	A AVG	A STDV
Arsenic	315	124	182	207	97.92344
copper	524	198	318	346.6667	164.8798
lead	7430	2610	4450	4830	2432.365
sodium	730	2410	677	1272.333	985.6046
zinc	30300	23600	15900	23266.67	7205.785

	D1	D2 AVG	D3	D AVG	D STDV
Arsenic	245	88.95	175	169.65	78.16244
copper	418	162.15	239	273.05	131.2797
lead	4870	1885.5	3520	3425.167	1494.508
sodium	413	828.5	1240	827.1667	413.5016
zinc	18500	12900	14900	15433.33	2837.84

	D2	D2 b
Arsenic	38.9	139
copper	80.3	244
lead	791	2980
sodium	768	889
zinc	7600	18200

	B1	B2	B3 AVG	B STDV
Arsenic	233	200	219	217.3333
copper	433	372	401	402
lead	4650	4120	4805	4525
sodium	545	476	919.5	646.8333
zinc	15700	13000	19900	16200

	E1	E2	E3	E AVG	E STDV
Arsenic	179	18.8	64.3	87.36667	82.5534
copper	347	91.5	186	208.1667	129.1843
lead	3460	278	1680	1806	1594.738
sodium	480	1030	1100	870	339.5585
zinc	13700	10600	17100	13800	3251.154

	B3	B3 b
Arsenic	196	242
copper	360	442
lead	3890	5720
sodium	940	899
zinc	20300	19500

	C1	C2	C3	C AVG	C STDV
Arsenic	263	48.4	147	152.8	107.4175
copper	556	362	361	426.3333	112.2957
lead	6240	863	2790	3297.667	2724.211
sodium	806	1570	688	1021.333	478.8082
zinc	16400	18600	9560	14853.33	4714.29

	BioComp	LeafComp
Arsenic	12.6	8.87
copper	577	31
lead	60.3	103
sodium	1320	262
zinc	957	204

	A AVG	B AVG	C AVG	D AVG	E AVG
Arsenic	207.00	217.33	152.80	169.65	87.37
copper	346.67	402.00	426.33	273.05	208.17
lead	4830.00	4525.00	3297.67	3425.17	1806.00
sodium	1272.33	646.83	1021.33	827.17	870.00
zinc	23266.67	16200.00	14853.33	15433.33	13800.00

	A STDV	B STDV	C STDV	D STDV	E STDV
Arsenic	97.92	16.56	107.42	78.16	82.55
copper	164.88	30.51	112.30	131.28	129.18
lead	2432.37	359.20	2724.21	1494.51	1594.74
sodium	985.60	238.64	478.81	413.50	339.56
zinc	7205.78	3477.07	4714.29	2837.84	3251.15

	A1	B1	C1	D1	E1	A2	B2	C2	D2	E2	A3	B3	C3	D3	E3	A4	BioComp	LeafComp
pH	7.55	7.35	7.35	7.35	7.1	7.45	7.4	7.4	7.6	7.5	7.7	7.55	7	7.35	7.28	7.4		
EC	3.09	2.88	3.17	0.96	2.38	3.87	2.61	3.8	2.8	3.42	2.6	3.38	2.82	2.59	2.88	1.98		
Organic M	6.11	9.98	12.03	9.373333	3.006266													
Organic C	3.55	5.64	5.99	2.46	11.43	5.79	7.58	22.81	12.27	12.73	6.98	5.13	9.47	6.45	21.11	1.2		

EC= mmho/cm

	A1	A2	A3	A AVG	A STDV
pH	7.55	7.45	7.7	7.566667	0.125831
EC	3.09	3.87	2.6	3.186667	0.640495
Organic M	6.11	9.98	12.03	9.373333	3.006266
Organic C	3.55	5.79	6.98	5.44	1.74158

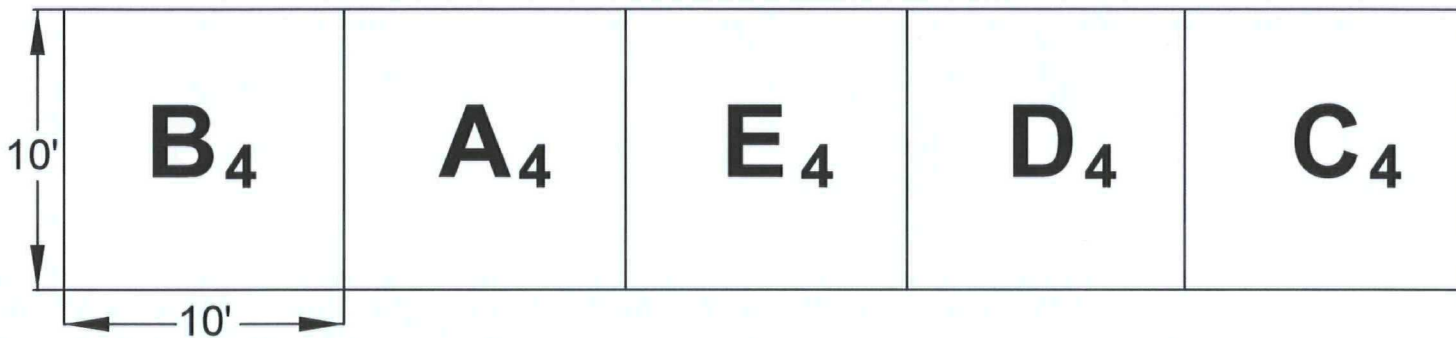
	B1	B2	B3	B AVG	B STDV
pH	7.35	7.4	7.55	7.433333	0.104083
EC	2.88	2.61	3.38	2.956667	0.390683
Organic M	9.27	13.07	8.85	10.39667	2.324679
Organic C	5.64	7.58	5.13	6.116667	1.292685

	E1	E2	E3	E AVG	E STDV
pH	7.1	7.5	7.28	7.293333	0.200333
EC	2.38	3.42	2.88	2.893333	0.520128
Organic M	19.71	21.94	36.4	26.01667	9.061094
Organic C	11.43	12.73	21.11	15.09	5.253837

	C1	C2	C3	C AVG	C STDV
pH	7.35	7.4	7	7.25	0.217945
EC	3.17	3.8	2.82	3.263333	0.496622
Organic M	10.34	39.33	16.33	22	15.30414
Organic C	5.99	22.81	9.47	12.75667	8.878611

	D1	D2	D3	D AVG	D STDV
pH	7.35	7.6	7.35	7.433333	0.144338
EC	0.96	2.8	2.59	2.116667	1.007191
Organic M	4.24	21.15	11.12	12.17	8.503758
Organic C	2.46	12.27	6.45	7.06	4.933366

	Biosolids	Leaf Compost
pH	5.7	7.2
EC	10.81	2.2
Organic M	58.9	18
Organic C	34.1	10.4



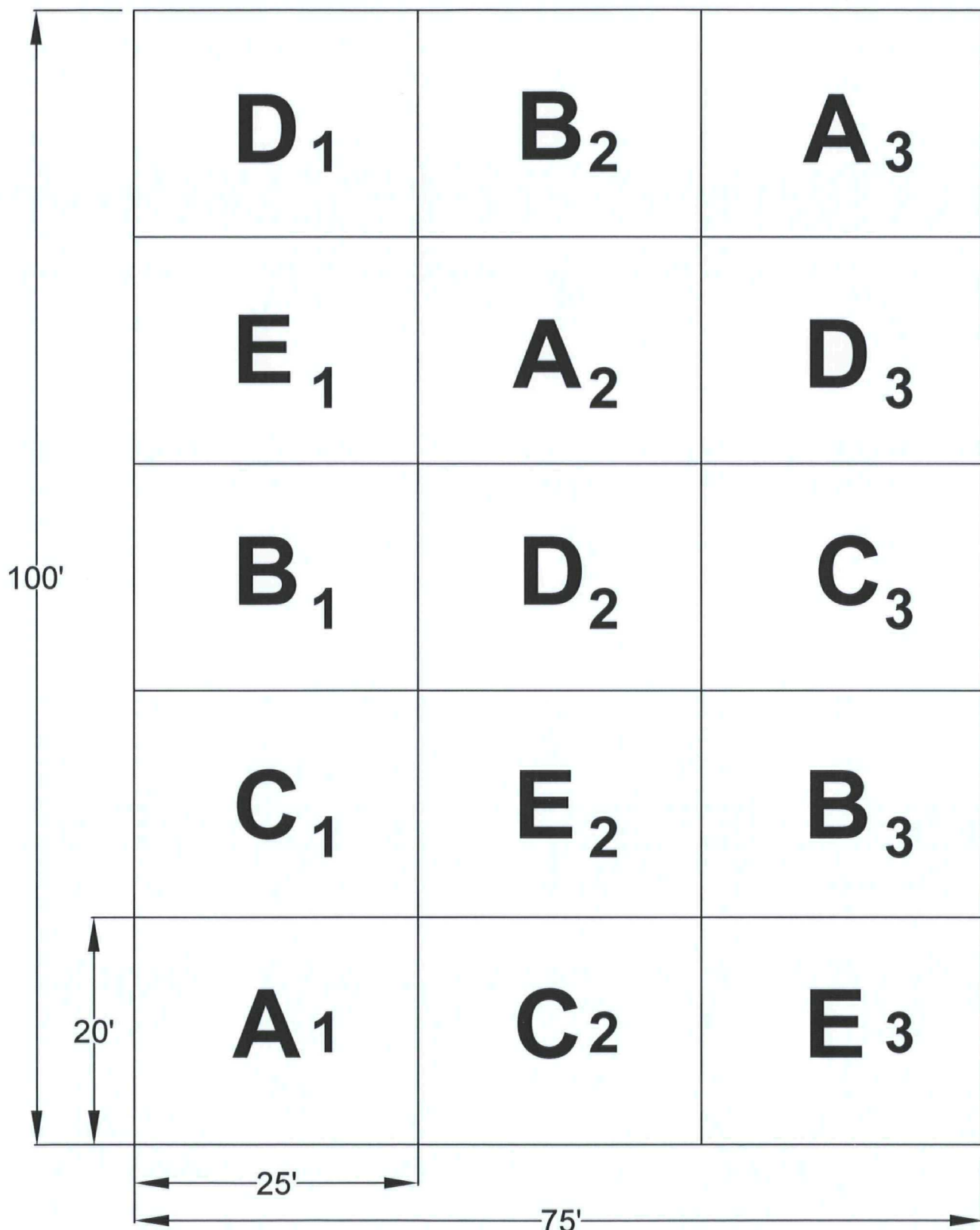
A = CONTROL (UNTREATED)
B = + 10% BIOSOLIDS COMPOST
C = + 20% BIOSOLIDS COMPOST

D = + 10% LEAF COMPOST
E = + 10% BIOSOLIDS COMPOST + 10% LEAF COMPOST



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FIGURE
SMALL TEST PLOT
(UNVEGETATED TAILINGS)
LOWER SILVER CREEK TAILING SITE
PILOT STUDY



A = CONTROL (UNTREATED)

B = + 10% BIOSOLIDS COMPOST

C = + 20% BIOSOLIDS COMPOST

D = + 10% LEAF COMPOST

E = + 10% BIOSOLIDS COMPOST + 10% LEAF COMPOST

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FIGURE 2
LOWER SILVER CREEK TAILING SITE
PILOT STUDY
MAY 2009



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FIGURE 3
PLOTS AFTER THE ADDITION OF THE
SOIL AMENDMENT
MAY 2009 PILOT STUDY
LOWER SILVER CREEK TAILING SITE
PARK CITY, UTAH



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FIGURE 4
PLOT AFTER STRAW MULCH AND FENCING
MAY 2009 PLOT STUDY
LOWER SILVER CREEK TAILING SITE
PARK CITY, UTAH



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FIGURE 5
SMALLER PLOT ON UNVEGETATED TAILINGS
MAY 2009 PILOT STUDY
LOWER SILVER CREEK TAILING SITE
PARK CITY, UTAH

Appendix A

Appendix A
Composition of Seed Mixtures
Lower Silver Creek Tailings Site
June 2009

Western Native Seed - Native Plant Seed for the Rocky Mountains and Western Great Plains
[navigation](#) | [common name index](#) | [specials](#) | [other services & links](#) | [download our catalog](#) | [Gift Certificates](#) | [cart](#)

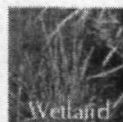

Wildflowers



Grasses



Tree/Shrub



Wetland



Seed Mixes

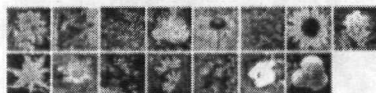
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**Wildflowers****\$6.00/oz, \$21.00/qtr lb,
\$60.00/lb**

Seeding rate: 4-8 oz/1,000 sq. ft.

% Species	Common Name
16 Balsamorhiza sagittata	Arrowleaf Balsamroot
12 Penstemon strictus	Rocky Mountain Penstemon
12 Hedysarum boreale	Chainpod
10 Eriogonum umbellatum	Sulfur Flower
10 Linum lewisii	Blue Flax
10 Gaillardia pulchella	Firewheel
8 Cleome serrulata	Rocky Mountain Bee Plant
8 Helianthus annuus	Annual Sunflower
4 Oxytropis sericea	Silky Locoweed
2 Penstemon venustus	Blue Mountain Penstemon
2 Wyethia amplexicaulis	Mules Ears
1.5 Erigeron speciosus	Showy Fleabane Daisy
1 Penstemon eatonii	Firecracker Penstemon
1 Viguiera multiflora	Showy Goldeneye
1 Sphaeralcea ambigua	Desert Globemallow
1 Iliamna rivularis	Wild Hollyhock
0.25 Calochortus gunnisonii	Mariposa Lilly
0.25 Astragalus utahensis	Milkvetch

**Grasses****\$4.00/qtr lb, \$10.00/lb,
\$90.00/10lb bag**

Seeding rate: 1-2 lbs/1,000 sq. ft.

% Species	Common Name
25 Pseudoroegneria spicata	Bluebunch Wheatgrass
20 Festuca idahoensis	Idaho Fescue
20 Pascopyrum smithii	Western Wheatgrass
12 Bromus marginatus	Mountain Brome
6 Stipa viridula	Green Needlegrass
5 Oryzopsis hymenoides	Indian Ricegrass
5 Leymus cinereus	Basin Wildrye
5 Poa secunda	Sandberg's Bluegrass
1 Stipa comata	Needle & Thread
1 Elymus elymoides	Bottlebrush Squirreltail

Meadow Mix**\$25.00/lb, \$225.00/10lb bag**

70% Sage Country Grasses
30% Sage Country Wildflowers
Seeding rate 1 lb/1,000 sq. ft.

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Montane Mixes

for mixed conifer forest openings at elevations between 6,000' and 9,000', 15-30 inches precipitation, winter snow, s

**Wildflowers**

**\$6.00/oz, \$21.00/qtr lb,
\$60.00/lb**

Seeding rate: 4-8 oz/1,000 sq.ft.

Grasses

**\$4.00/qtr lb,
\$10.00/lb,
\$90.00/10lb bag**

Seeding rate: 1-2 lbs/1,000 sq.ft.

% Species	Common Name	% Species	Common Name
12 Lupinus alpestris	Mountain Lupine	25 Festuca arizonica	Arizona Fescue
12 Linum perenne v. lewisii	Blue Flax	25 Elymus trachycaulus	Slender Wheatgrass 'San Luis'
12 Penstemon virgatus	Wand Beardtongue	20 Bromus marginatus	Mountain Brome
12 Penstemon strictus	Rocky Mountain Penstemon	15 Pascopyrum smithii	Western Wheatgrass
10 Rudbeckia hirta	Black-eyed Susan	7 Bouteloua gracilis	Blue Grama
6 Oxytropis sericea	Silky Locoweed	4 Schizachyrium scoparium	Little Bluestem
6 Eriogonum umbellatum	Sulfur Flower	3 Koeleria macrantha	Junegrass
6 Hedysarum boreale	Chainpod	0.5 Poa fendleriana	Muttongrass
6 Oxytropis lambertii	Showy Locoweed	0.25 Danthonia parryi	Parry Oatgrass
6 Erigeron speciosus	Showy Fleabane Daisy	0.25 Muhlenbergia montana	Mountain Muhly
4 Gaillardia aristata	Perennial Blanketflower		
3 Liatris punctata	Dotted Gayfeather		
3 Viguiera multiflora	Showy Goldeneye		
1 Bahía dissecta	Mountain Bahía		
0.25 Potentilla hippiana	Silver Cinquefoil		
0.25 Calochortus gunnisonii	Mariposa Lilly		
0.25 Machaeranthera tanacetifolia	Tansy Aster		
0.25 Aster laevis	Smooth Blue Aster		

Meadow Mix

**\$25.00/lb,
\$225.00/10lb bag**

70% Montane Grasses
30% Montane Wildflowers
Seeding rate: 1 lb/1,000 sq.ft.

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High Altitude Mixes

a general mix for most sites at elevation 8,000' and 11,000', 20-36 inches precipitation, winter snow



Wildflowers

\$6.00/oz, \$21.00/qtr lb, \$60.00/lb

Seeding rate: 4-8 oz/1,000 sq.ft.

% Species	Common Name
12 Helenium hoopesii	Orange Mountain Daisy
12 Penstemon strictus	Rocky Mountain Penstemon
12 Eriogonum umbellatum	Sulfur Flower
12 Delphinium occidentale	Western Larkspur
8 Oxytropis sericea	Silky Locoweed
8 Oxytropis lambertii	Showy Locoweed
7 Rudbeckia hirta	Black-eyed Susan
7 Lupinus alpestris	Mountain Lupine
6 Penstemon virgatus	Wand Beardtongue
6 Penstemon venustus	Blue Mountain Penstemon
4 Erigeron speciosus	Showy Fleabane Daisy
3 Senecio atratus	Golden Butterwort
1 Viguiera multiflora	Showy Goldeneye
1 Astragalus bisulcatus	Two Groove Milkvetch
0.25 Aster laevis	Smooth Blue Aster
0.25 Penstemon whippleanus	Dusky Beardtongue
0.25 Polemonium foliosissimum	Jacob's Ladder
0.25 Astragalus adsurgens	Upright Milkvetch



Grasses

\$4.00/qtr lb,

\$10.00/lb,

\$90.00/10lb bag

Seeding rate: 1-2
lbs/1,000 sq.ft. or 25
lbs/acre

% Species	Common Name
25 Bromus ciliatus	Fringed Brome
25 Elymus trachycaulus	Slender Wheatgrass
15 Festuca saximontana	Rocky Mountain Fescue
10 Deschampsia cespitosa	Tufted Hairgrass
6 Festuca brachyphylla	Alpine Fescue
6 Trisetum spicatum	Spike Trisetum
5 Koeleria macrantha	Junegrass
5 Poa ampla	Big Bluegrass
3 Poa alpina	Alpine Bluegrass

Meadow Mix

70% High Altitude
Grasses

30% High Altitude
Wildflowers

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Wet Meadow Mixes

for seasonally or permanently wet soils



High Plains elevation 3,500' - 7,000'

Mountain elevation 6,500' - 9,500'

\$5.50/oz, \$19.25/qtr lb, \$55.00/lb, \$495.00/10lb bag \$5.50/oz, \$19.25/qtr lb, \$55.00/lb, \$495.00/10lb bag \$5.50/oz

Seeding rate: 8 oz/1,000 sq.ft.

Seeding rate: 8 oz/1,000 sq.ft.

% Species	Common Name
12 Elymus canadensis	Canada Wildrye
12 Panicum virgatum	Switchgrass
12 Scirpus maritimus	Alkali Bulrush
10 Beckmannia syzigachne	American Sloughgrass
10 Spartina pectinata	Prairie Cordgrass
6 Scirpus validus	Soft Stem Bulrush
6 Carex praegracilis	Meadow Sedge
6 Scirpus americanus	Olney's Threesquare Bulrush
6 Carex nebrascensis	Nebraska Sedge
6 Puccinellia airoides	Alkali Grass
5 Scirpus acutus	Hardstem Bulrush
4 Eleocharis palustris	Creeping Spikerush
2 Carex microptera	Popcorn Sedge
2 Scirpus pallidus	Pale Bulrush
1 Juncus balticus	Baltic Rush

% Species	Common Name
12 Deschampsia cespitosa	Tufted Hairgrass
12 Glyceria grandis	Giant Mannagrass
10 Poa palustris	Fowl Bluegrass
8 Beckmannia syzigachne	American Sloughgrass
8 Puccinellia airoides	Alkaligrass
6 Carex simulata	Slender Sedge
6 Hordeum brachyantherum	Meadow Barley
6 Scirpus microcarpus	Small Fruited Bulrush
6 Carex athrostachya	Mountain Sedge
6 Carex nebrascensis	Nebraska Sedge
5 Calamagrostis stricta	Northern Reedgrass
5 Catabrosa aquatica	Brook Grass
4 Carex rostrata	Beaked Sedge
4 Eleocharis palustris	Creeping Spikerush
1.5 Eleocharis rostellata	Beaked Spikerush
1 Calamagrostis canadensis	Blue Joint Reedgrass
1 Carex vesicaria	Bladder Sedge
0.25 Juncus balticus	Baltic Rush
0.25 Juncus saximontanus	Rocky Mountain Rush

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High Altitude Mixes

a general mix for most sites at elevation 8,000' and 11,000', 20-36 inches precipitation, winter snow

*Wildflowers***\$6.00/oz, \$21.00/qtr lb, \$60.00/lb**

Seeding rate: 4-8 oz/1,000 sq.ft.

% Species	Common Name
12 Helenium hoopesii	Orange Mountain Daisy
12 Penstemon strictus	Rocky Mountain Penstemon
12 Eriogonum umbellatum	Sulfur Flower
12 Delphinium occidentale	Western Larkspur
8 Oxytropis sericea	Silky Locoweed
8 Oxytropis lambertii	Showy Locoweed
7 Rudbeckia hirta	Black-eyed Susan
7 Lupinus alpestris	Mountain Lupine
6 Penstemon virgatus	Wand Beardtongue
6 Penstemon venustus	Blue Mountain Penstemon
4 Erigeron speciosus	Showy Fleabane Daisy
3 Senecio atratus	Golden Butterwort
1 Viguiera multiflora	Showy Goldeneye
1 Astragalus bisulcatus	Two Groove Milkvetch
0.25 Aster laevis	Smooth Blue Aster
0.25 Penstemon whippleanus	Dusky Beardtongue
0.25 Polemonium foliosissimum	Jacob's Ladder
0.25 Astragalus adsurgens	Upright Milkvetch

*Grasses***\$4.00/qtr lb,****\$10.00/lb,****\$90.00/10lb bag**

Seeding rate: 1-2

lbs/1,000 sq.ft. or 25
lbs/acre

% Species	Common Name
25 Bromus ciliatus	Fringed Brome
25 Elymus trachycaulus	Slender Wheatgrass
15 Festuca saximontana	Rocky Mountain Fescue
10 Deschampsia cespitosa	Tufted Hairgrass
6 Festuca brachyphylla	Alpine Fescue
6 Trisetum spicatum	Spike Trisetum
5 Koeleria macrantha	Junegrass
5 Poa ampla	Big Bluegrass
3 Poa alpina	Alpine Bluegrass

*Meadow Mix*70% High Altitude
Grasses30% High Altitude
Wildflowers

Seeding rate: 1 lb/1,000
sq.ft.

\$25.00/lb,
\$225.00/10lb bag

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Appendix B

Appendix B
Soil Analytical Results
Lower Silver Creek Tailings Site
June 2009

ANALYTICAL REPORT

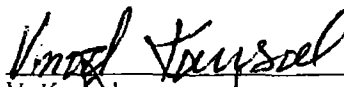
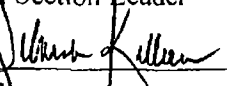
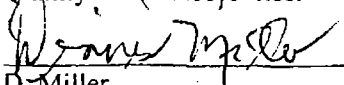


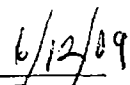
Prepared by
LOCKHEED MARTIN, Inc.

Lower Silver Creek Tailings Site
Park City, Utah

June 2009

EPA Work Assignment No. 0-300
LOCKHEED MARTIN Work Order EAC0300
EPA Contract No. EP-C-04-032

Submitted to
G. Newhart
EPA-ERT

		
V. Kansal	D. Killeen	D. Miller
Analytical Section Leader	Quality Assurance Officer	Program Manager
		
Date	Date	Date

Analysis by:
REAC

Prepared by:
Y. Mehra

Reviewed by:
J. Soroka

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Appendix A Data for Metals in Soil U 168

Appendix A will be furnished on request.

Introduction

REAC personnel, in response to WA 0-300, provided analytical support for environmental samples collected from the Lower Silver Creek Tailings Site in Park City, Utah as described in the following table. The support also included QA/QC, data review and preparation of an analytical report containing a summary of the analytical and the QA/QC results.

The samples were treated with procedures consistent with those specified in REAC SOP #1008.

Chain of Custody #	Number of Samples	Sampling Date	Date Received	Matrix	Analysis /Method	Laboratory	Data Package
300-05/20/09-0003	20	05/14/09	05/20/09	Soil	TAL Metals/ REAC SOP 1811 & 1832	REAC ¹	U 168

¹ REAC is NELAC certified for metals in solid material

Case Narrative

The data in this report have been validated to three significant figures. Any other representation of the data is the responsibility of the user. All data validation flags have been inserted into the results tables. The laboratory did not report results less than the RL.

Metals in Water Package U 168

The RPD exceeded the acceptable QC limits for antimony and arsenic in sample 300-0026. All sample results for arsenic and antimony are qualified estimated (J).

The serial dilution for sample 300-0034 exceeded the QC limits for cadmium, cobalt, lead, manganese, nickel, selenium and sodium. All sample results are qualified estimated (J) for cadmium, cobalt, lead, manganese, nickel and selenium.

The MS/MSD recoveries for thallium in sample 300-0026 were outside QC limits. All sample results for thallium are qualified estimated low (J-) for thallium. The MS/MSD recoveries for barium and the MSD recovery for sodium in sample 0300-0034 were outside QC limits. All sample results for barium and sodium are qualified estimated low (J-).

Summary of Abbreviations

BFB	Bromofluorobenzene
C	Centigrade
CLP	Contract Laboratory Program
COC	Chain of Custody
conc	concentration
cont	continued
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
D	(Surrogate Table) value is from a diluted sample and was not calculated
Dioxin	Polychlorinated dibenzo-p-dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF)
DFTPP	Decafluorotriphenylphosphine
EMPC	Estimated maximum possible concentration
GC/MS	Gas Chromatography/ Mass Spectrometry
IS	Internal Standard
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDA	Minimum Detectable Activity
MS (BS)	Matrix Spike (Blank Spike)
MSD (BSD)	Matrix Spike Duplicate (Blank Spike Duplicate)
MW	Molecular Weight
NA	Not Applicable or Not Available
NAD	Normalized Absolute Difference
NC	Not Calculated
NR	Not Requested/Not Reported
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
SOP	Standard Operating Procedure
ppbv	parts per billion by volume
ppm	parts per million
pptv	parts per trillion by volume
PQL	Practical Quantitation Limit
PAL	Performance Acceptance Limit
QA/QC	Quality Assurance/Quality Control
QL	Quantitation Limit
REAC	Response Engineering and Analytical Contract
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SIM	Selected Ion Monitoring
Sur	Surrogate
TIC	Tentatively Identified Compound
TCLP	Toxicity Characteristic Leaching Procedure
VOC	Volatile Organic Compound
*	Value exceeds the acceptable QC limits

m ³	cubic meter	g	gram	kg	kilogram	L	liter
μg	microgram	μL	microliter	mg	milligram	mL	milliliter
ng	nanogram	pg	picogram	pCi	picocurie	s	sigma

Data Validation Flags

J	Value is estimated	R	Value is unusable
J+	Value is estimated high (metals only)	U	Not detected
J-	Value is estimated low (metals only)	UJ	Not detected and RL is estimated
N	Presumptively present (Aroclors only)		

Rev. 1/14/09

Table 1.1 Results of the Analysis for Metals in Soil
WA # 0-300 Lower Silver Creek Tailings Site
Results Based on Dry Weight

Page 1 of 2

Method REAC SOP 1811/1832

Sample No.	Method Blank-052209	300-0022	300-0023	300-0024	300-0025	300-0026
Location	Lab	A1	B1	C1	D1	E1
% Solids	NA	85	79	73	83	68
Analyte	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg
Aluminum	U 20.0	2760 19.4	3160 20.8	3930 19.6	3080 15.3	5780 20.1
Antimony	U 1.40	143 J 1.36	118 J 1.45	136 J 1.37	111 J 1.07	78.0 J 1.41
Arsenic	U 1.60	315 J 1.56	233 J 1.66	263 J 1.57	245 J 1.23	179 J 1.61
Barium	U 0.400	78.5 J 0.389	103 J 0.415	140 J 0.391	53.0 J 0.307	191 J 0.403
Beryllium	U 0.300	U 0.292	U 0.311	U 0.294	U 0.230	U 0.302
Cadmium	U 0.400	108 J 0.389	99.2 J 0.415	79.0 J 0.391	96.4 J 0.307	71.4 J 0.403
Calcium	U 9.90	63500 9.63	64800 10.3	61900 9.69	41300 7.60	45800 9.97
Chromium	U 0.500	14.4 0.486	13.8 0.519	14.9 0.489	12.0 0.384	17.3 0.504
Cobalt	U 0.400	8.37 J 0.389	8.28 J 0.415	9.69 J 0.391	13.1 J 0.307	10.0 J 0.403
Copper	U 0.700	524 0.681	433 0.726	556 0.685	418 0.537	347 0.705
Iron	U 15.0	36000 72.9	25400 15.6	27400 14.7	50400 57.6	31400 75.5
Lead	U 1.00	7430 J 0.972	4650 J 1.04	6240 J 0.978	4870 J 0.767	3460 J 1.01
Magnesium	U 20.0	14500 19.4	12800 20.8	11400 19.6	10900 15.3	8920 20.1
Manganese	U 0.400	2040 J 0.389	1810 J 0.415	1930 J 0.391	1830 J 0.307	1370 J 0.403
Mercury	U 0.040	9.97 0.413	6.71 0.444	6.91 0.435	5.36 0.402	4.76 0.258
Nickel	U 0.600	9.25 J 0.583	8.95 J 0.623	10.7 J 0.587	9.26 J 0.460	11.9 J 0.604
Potassium	U 25.0	532 24.3	905 25.9	1300 24.5	717 19.2	2020 25.2
Selenium	U 1.30	13.5 J 1.26	10.4 J 1.35	12.0 J 1.27	16.9 J 0.998	11.2 J 1.31
Silver	U 0.500	50.7 0.486	27.2 0.519	37.7 0.489	28.4 0.384	23.9 0.504
Sodium	U 100	730 J 97.2	545 J 104	806 J 97.8	413 J 76.7	480 J 101
Thallium	U 1.80	5.17 J 1.75	9.12 J 1.87	6.54 J 1.76	3.43 J 1.38	4.37 J 1.81
Vanadium	U 0.400	7.07 0.389	8.09 0.415	9.03 0.391	8.42 0.307	14.0 0.403
Zinc	U 3.10	30300 30.1	15700 16.1	16400 15.2	18500 11.9	13700 15.6

Table 1.1 (cont) Results of the Analysis for Metals in Soil
WA # 0-300 Lower Silver Creek Tailings Site
Results Based on Dry Weight

Method REAC SOP 1811/1832

Sample No.	300-0027	300-0028	300-0029	300-0030	300-0031	300-0032
Location	A2	B2	C2	D2	D2b	E2
% Solids	62	72	56	64	65	61
Analyte	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg
Aluminum	4490 21.4	3730 19.2	8050 22.7	10600 20.0	5930 19.1	12500 20.0
Antimony	55.9 J 1.50	107 J 1.34	24.8 J 1.59	12.8 J 1.40	56.2 J 1.34	4.60 J 1.40
Arsenic	124 J 1.71	200 J 1.53	48.4 J 1.82	38.9 J 1.60	139 J 1.53	18.8 J 1.60
Barium	97.7 J 0.427	121 J 0.383	351 J 0.455	145 J 0.401	121 J 0.382	235 J 0.400
Beryllium	U 0.320	U 0.287	U 0.341	0.498 0.300	U 0.287	0.597 0.300
Cadmium	155 J 0.427	61.6 J 0.383	60.8 J 0.455	36.0 J 0.401	93.3 J 0.382	29.6 J 0.400
Calcium	92400 10.6	58900 9.48	48200 11.3	39500 9.92	56900 9.46	23400 9.90
Chromium	9.59 0.534	12.2 0.479	21.7 0.569	14.9 0.501	12.4 0.478	16.3 0.500
Cobalt	9.85 J 0.427	11.7 J 0.383	10.7 J 0.455	7.44 J 0.401	10.5 J 0.382	15.0 J 0.400
Copper	198 0.748	372 0.670	362 0.796	80.3 0.701	244 0.669	91.5 0.700
Iron	15700 16.0	28100 14.4	16300 17.1	15500 15.0	22600 14.3	16100 15.0
Lead	2610 J 1.07	4120 J 0.958	863 J 1.14	791 J 1.00	2980 J 0.956	278 J 1.00
Magnesium	8200 21.4	8630 19.2	7130 22.7	8830 20.0	10000 19.1	5160 20.0
Manganese	2130 J 0.427	1970 J 0.383	1070 J 0.455	939 J 0.401	2170 J 0.382	1720 J 0.400
Mercury	3.81 0.273	8.94 0.365	2.52 0.283	2.82 0.265	3.22 0.252	2.57 0.273
Nickel	10.7 J 0.641	10.3 J 0.575	19.7 J 0.682	11.0 J 0.601	11.3 J 0.573	16.2 J 0.600
Potassium	1080 26.7	968 23.9	3090 28.4	3110 25.0	1690 23.9	3760 25.0
Selenium	5.32 J 1.39	10.6 J 1.25	8.94 J 1.48	2.54 J 1.30	6.56 J 1.24	2.17 J 1.30
Silver	16.3 0.534	25.1 0.479	14.7 0.569	5.58 0.501	16.1 0.478	3.48 0.500
Sodium	2410 J 107	476 J 95.8	1570 J 114	768 J 100	889 J 95.6	1030 J 100
Thallium	10.8 J 1.92	5.17 J 1.72	5.24 J 2.05	2.74 J 1.80	5.34 J 1.72	2.06 J 1.80
Vanadium	10.4 0.427	8.89 0.383	17.9 0.455	25.9 0.401	14.2 0.382	29.7 0.400
Zinc	23600 16.6	13000 14.8	18600 17.6	7600 15.5	18200 14.8	10600 15.5

Table 1.1 (cont) Results of the Analysis for Metals in Soil
WA # 0-300 Lower Silver Creek Tailings Site
Results Based on Dry Weight

Page 2 of 2

Method REAC SOP 1811/1832

Sample No.	300-0033		300-0034		300-0035		300-0036		300-0037		300-0038	
Location	A3		B3		C3		D3		B3B		E3	
% Solids	67		74		70		74		72		56	
Analyte	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg
Aluminum	3440	18.9	4110	19.0	4360	20.7	5560	17.6	3810	19.3	5660	23.8
Antimony	99.1 J	1.32	92.2 J	1.33	98.0 J	1.45	67.4 J	1.23	124 J	1.35	33.8 J	1.67
Arsenic	182 J	1.51	196 J	1.52	147 J	1.66	175 J	1.40	242 J	1.54	64.3 J	1.90
Barium	116 J-0.378		111 J-0.381		210 J-0.414		110 J-0.351		104 J-0.386		178 J-0.476	
Beryllium	U	0.283	U	0.285	U	0.311	0.276	0.263	U	0.289	U	0.357
Cadmium	88.1 J	0.378	81.5 J	0.381	39.3 J	0.414	81.9 J	0.351	74.8 J	0.386	61.0 J	0.476
Calcium	59500	9.35	60900	9.42	52300	10.2	41100	8.69	63800	9.55	47200	11.8
Chromium	11.0	0.472	12.8	0.476	16.4	0.518	11.8	0.439	14.5	0.482	11.3	0.595
Cobalt	17.4 J	0.378	11.7 J	0.381	9.73 J	0.414	12.0 J	0.351	13.1 J	0.386	8.91 J	0.476
Copper	318	0.661	360	0.666	361	0.725	239	0.614	442	0.675	186	0.833
Iron	24700	14.2	33400	71.4	24800	15.5	35800	65.8	36000	72.3	15000	89.3
Lead	4450 J	0.945	3890 J	0.952	2790 J	1.04	3520 J	0.878	5720 J	0.965	1680 J	1.19
Magnesium	9340	18.9	9720	19.0	8590	20.7	9620	17.6	10200	19.3	6570	23.8
Manganese	3520 J	0.378	1640 J	0.381	1300 J	0.414	1710 J	0.351	1880 J	0.386	1760 J	0.476
Mercury	4.16	0.245	6.44	0.450	3.82	0.223	3.42	0.193	14.0	0.789	3.09	0.275
Nickel	8.97 J	0.567	13.5 J	0.571	11.5 J	0.621	10.9 J	0.527	12.8 J	0.579	12.7 J	0.714
Potassium	748	23.6	1010	23.8	1780	25.9	1640	21.9	1000	24.1	2210	29.8
Selenium	8.96 J	1.23	12.1 J	1.24	11.5 J	1.35	11.1 J	1.14	13.8 J	1.25	4.96 J	1.55
Silver	21.1	0.472	26.6	0.476	22.0	0.518	16.8	0.439	34.1	0.482	12.4	0.595
Sodium	677 J-94.5		940 J-95.2		688 J-104		1240 J-87.8		899 J-96.5		1100 J-119	
Thallium	19.3 J-1.70		6.01 J-1.71		3.09 J-1.86		4.72 J-1.58		6.81 J-1.74		3.97 J-2.14	
Vanadium	8.53	0.378	10.3	0.381	9.81	0.414	12.6	0.351	9.30	0.386	12.8	0.476
Zinc	15900	14.6	20300	14.8	9560	16.0	14900	13.6	19500	14.9	17100	18.5

Table 1.1 (cont) Results of the Analysis for Metals in Soil
WA # 0-300 Lower Silver Creek Tailings Site
Results Based on Dry Weight

Method REAC SOP 1811/1832

Sample No.	300-0039		300-0040		300-0041	
Location	A4		Bio compost		Leaf compost	
% Solids	88		52		62	
Analyte	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg
Aluminum	2910	15.1	10400	24.8	14500	19.4
Antimony	165 J	1.05	4.07 J	1.74	U	1.36
Arsenic	380 J	1.20	12.6 J	1.99	8.87 J	1.55
Barium	44.6 J-0.301		616 J-0.496		165 J-0.389	
Beryllium	U	0.226	U	0.372	0.680	0.291
Cadmium	136 J	0.301	2.67 J	0.496	1.27 J	0.389
Calcium	39300	7.45	53200	12.3	10800	9.62
Chromium	20.2	0.376	34.4	0.620	15.8	0.486
Cobalt	14.0 J	0.301	10.4 J	0.496	8.05 J	0.389
Copper	543	0.527	577	0.868	31.0	0.680
Iron	62800	56.4	19400	18.6	15800	14.6
Lead	8510 J	0.753	60.3 J	1.24	103 J	0.972
Magnesium	11800	15.1	6000	24.8	5380	19.4
Manganese	1660 J	0.301	227 J	0.496	652 J	0.389
Mercury	7.11	0.583	2.47	0.142	3.39	0.234
Nickel	9.02 J	0.452	19.5 J	0.744	11.1 J	0.583
Potassium	774	18.8	5260	31.0	4580	24.3
Selenium	21.7 J	0.978	13.2 J	1.61	U	1.26
Silver	44.7	0.376	18.9	0.620	0.775	0.486
Sodium	853 J-75.3		1320 J-124		262 J-97.2	
Thallium	7.03 J-1.35		U J-2.23		U J-1.75	
Vanadium	6.64	0.301	19.2	0.496	28.9	0.389
Zinc	28400	23.3	957	3.85	204	3.01

Table 2.1 Results of the MS/MSD Analysis for Metals in Sediment
WA # 0-300 Lower Silver Creek Tailings Site
Results Based on Dry Weight

Sample No. 300-0026

Page 1 of 1

Analyte	Sample Result mg/kg	MS Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Spike Added mg/kg	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits %Recovery	RPD
Aluminum	5780	195	6690	NC	197	6190	NC	8	75-125	20
Antimony	78.0	39.0	86.4	22	39.5	112	86	26	0-110	20
Arsenic	179	39.0	176	NC	39.5	217	NC	21	75-125	20
Barium	191	39.0	256	NC	39.5	249	NC	3	75-125	20
Beryllium	U	39.0	37.4	96	39.5	38.1	96	2	75-125	20
Cadmium	71.4	39.0	101	76	39.5	111	100	9	75-125	20
Calcium	45800	195	41500	NC	197	47200	NC	13	75-125	20
Chromium	17.3	39.0	52.9	91	39.5	53.0	90	0	75-125	20
Cobalt	10.0	39.0	45.4	91	39.5	47.2	94	4	75-125	20
Copper	347	39.0	384	NC	39.5	420	NC	9	75-125	20
Iron	31400	195	30000	NC	197	32700	NC	9	75-125	20
Lead	3460	39.0	3070	NC	39.5	3660	NC	18	75-125	20
Magnesium	8920	195	8450	NC	197	9210	NC	9	75-125	20
Manganese	1370	39.0	1250	NC	39.5	1460	NC	15	75-125	20
Mercury	4.76	0.525	5.95	NC	0.499	5.07	NC	16	75-125	20
Nickel	11.9	39.0	48.2	93	39.5	48.7	93	1	75-125	20
Potassium	2020	195	2330	NC	197	2170	NC	7	75-125	20
Selenium	11.2	19.5	28.8	90	19.7	30.9	100	7	75-125	20
Silver	23.9	39.0	57.2	85	39.5	64.3	102	12	75-125	20
Sodium	480	779	1190	91	790	1230	95	3	75-125	20
Thallium	4.37	19.5	17.9	69	19.7	18.7	73	4	75-125	20
Vanadium	14.0	39.0	50.3	93	39.5	49.7	90	1	75-125	20
Zinc	13700	39.0	13400	NC	39.5	14700	NC	9	75-125	20

Sample No. 361-0096

Analyte	Sample Result mg/kg	MS Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Spike Added mg/kg	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits %Recovery	RPD
Aluminum	4110	177	3710	NC	186	3760	NC	1	75-125	20
Antimony	92.2	35.3	123	87	37.3	144	139	16	0-110	20
Arsenic	196	35.3	242	NC	37.3	262	NC	8	75-125	20
Barium	111	35.3	126	42	37.3	136	67	8	75-125	20
Beryllium	U	35.3	33.6	95	37.3	35.2	94	5	75-125	20
Cadmium	81.5	35.3	108	75	37.3	111	79	3	75-125	20
Calcium	60900	177	55500	NC	186	56100	NC	1	75-125	20
Chromium	12.8	35.3	45.3	92	37.3	48.1	95	6	75-125	20
Cobalt	11.7	35.3	45.2	95	37.3	45.4	90	0	75-125	20
Copper	360	35.3	422	NC	37.3	439	NC	4	75-125	20
Iron	33400	177	36600	NC	186	37300	NC	2	75-125	20
Lead	3890	35.3	4410	NC	37.3	4700	NC	6	75-125	20
Magnesium	9720	177	10200	NC	186	10700	NC	5	75-125	20
Manganese	1640	35.3	1920	NC	37.3	1690	NC	13	75-125	20
Mercury	6.44	0.458	6.92	NC	0.443	6.40	NC	8	75-125	20
Nickel	13.5	35.3	44.8	89	37.3	45.8	87	2	75-125	20
Potassium	1010	177	1040	NC	186	1040	NC	0	75-125	20
Selenium	12.1	17.7	29.6	99	18.6	31.3	103	6	75-125	20
Silver	26.6	35.3	66.6	113	37.3	63.4	99	5	75-125	20
Sodium	940	707	1480	76	746	1480	72	0	75-125	20
Thallium	6.01	17.7	19.7	77	18.6	20.2	76	3	75-125	20
Vanadium	10.3	35.3	41.7	89	37.3	42.9	87	3	75-125	20
Zinc	20300	35.3	17600	NC	37.3	17200	NC	2	75-125	20

Table 2.2 Results of the LCS Analysis for Metals in Sediment
WA # 0-300 Lower Silver Creek Tailings Site

Page 1 of 1

LCS Standard: ER ERA Lot No. D062-540-021809
Date Analyzed: 05/29/2009

Mercury: ERA Lot No. D064-540-052609
Date Analyzed: 05/26/2009

Analyte	Conc. Recovered mg/Kg	LCS Value mg/Kg	% Recovery	QC Limits, PALs % Recovery
Aluminum	10500	11000	95	6130 - 15800
Antimony	41.9	81.5	51	D.L - 166
Arsenic	146	158	92	129 - 187
Barium	349	348	100	281 - 415
Beryllium	101	106	95	86.5 - 126
Cadmium	174	187	93	154 - 220
Calcium	9290	9650	96	7800 - 11500
Chromium	83.5	89.5	93	70.5 - 108
Cobalt	267	277	96	224 - 330
Copper	124	129	96	108 - 151
Iron	18200	18600	98	9380 - 27700
Lead	164	172	95	136 - 207
Magnesium	4920	5030	98	3960 - 6100
Manganese	607	633	96	518 - 747
Mercury	9.00	7.34	123	5.26 - 9.41
Nickel	96.5	99.0	97	80.4 - 118
Potassium	3170	4010	79	2950 - 5070
Selenium	144	148	97	116 - 179
Silver	63.0	66.0	95	43.7 - 88.2
Sodium	752	883	85	651 - 1110
Thallium	217	268	81	208 - 328
Vanadium	185	194	95	154 - 233
Zinc	373	394	95	317 - 470

PAL - Performance Acceptance Limits

LCS Standard: ER ERA Lot No. D062-540-021809
Date Analyzed: 05/29/2009

Mercury: ERA Lot No. D064-540-052609
Date Analyzed: 06/01/2009

Analyte	Conc. Recovered mg/Kg	LCS Value mg/Kg	% Recovery	QC Limits, PALs % Recovery
Aluminum	10500	11000	95	6130 - 15800
Antimony	42.7	81.5	52	D.L - 166
Arsenic	149	158	94	129 - 187
Barium	348	348	100	281 - 415
Beryllium	101	106	95	86.5 - 126
Cadmium	178	187	95	154 - 220
Calcium	9060	9650	94	7800 - 11500
Chromium	84.2	89.5	94	70.5 - 108
Cobalt	269	277	97	224 - 330
Copper	124	129	96	108 - 151
Iron	18400	18600	99	9380 - 27700
Lead	167	172	97	136 - 207
Magnesium	5010	5030	100	3960 - 6100
Manganese	620	633	98	518 - 747
Nickel	97.5	99.0	98	80.4 - 118
Potassium	3290	4010	82	2950 - 5070
Selenium	147	148	99	116 - 179
Silver	62.2	66.0	94	43.7 - 88.2
Sodium	744	883	84	651 - 1110
Thallium	221	268	82	208 - 328
Vanadium	187	194	96	154 - 233
Zinc	380	394	96	317 - 470

PAL - Performance Acceptance Limits

Site #: 300

Contact Phone: 609-865-4279

Lab: REAC

NO# R905011

Lab #	Sample #	Location	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	MS/MSD
01	300-0022	A1	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
02	300-0023	B1	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
03	300-0024	C1	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
04	300-0025	D1	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
05	300-0026	E1	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	Y
06	300-0027	A2	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
07	300-0028	B2	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
08	300-0029	C2	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
09	300-0030	D2	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
10	300-0031	D2b	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
11	300-0032	E2	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
12	300-0033	A3	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
13	300-0034	B3	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	Y
14	300-0035	C3	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
15	300-0036	D3	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
16	300-0037	B3B	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
17	300-0038	E3	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
18	300-0039	A4	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
19	300-0040	Bio compost	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	
20	300-0041	Leaf compost	TAL metals +Hg	Soil	5/14/2009	1	8 oz jar	4C	

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Received 30 June

[illegible]



Appendix C

Appendix C
Soil Fertility Results
Lower Silver Creek Tailings Site
June 2009



New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4005

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX

Sample ID: A1

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.55 Moderately alkaline, too high for growth of many plants and indicates either severe overliming or a salt-affected soil.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

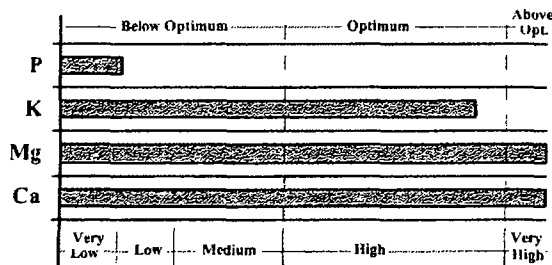
Phosphorus: 25 (Below Optimum)

Potassium: 262 (Optimum)

Magnesium: 1175 (Above Optimum)

Calcium: 21912 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
709 (High)

Copper:
100 (High)

Manganese:
319 (High)

Boron:
8.6 (Adequate)

Iron:
210 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.09 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 11.49%

Loss On Ignition: Organic Matter = 6.11%, Organic Carbon = 3.55%

Mechanical Analysis: Sand = 61%, Silt = 33%, Clay = 7%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a moderately alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost or wood ashes to the area. The pH may be reduced by the application of powdered sulfur, iron sulfate, or aluminum sulfate. One of these materials should be spread uniformly on the surface, then mixed thoroughly to a 6 inch depth by shovel or by tilling. The rates of application are:

sulfur : 3 pounds/1000 sq. ft.
Iron sulfate : 27 pounds/1000 sq. ft.
Aluminum sulfate : 24 pounds/1000 sq. ft.

Have the soil tested again in one year.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate low phosphorus (P) and high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-2-1) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 10 pounds 10-20-10 (Jonathan Green Root Builder),
Or 6.5 pounds 15-30-15 (MiracleGro Liquid),
Or 20 pounds 5-10-5 (Agway, Terre, Jonathan Green Flower & Vegetable Care),
Or 12.5 pounds 8-16-8 (Jonathan Green Multiplex)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate low phosphorus (P) and high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (2-2-1) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1.5 pounds 12-6-6 (Vigoro Premium Nursery Food, Sta-Green Nursery Special SlowRelease) plus 0.5 pound (9 ounces) 0-20-0 (Superphosphate) or 0.25 pound (4 ounces) 0-40-0 (Triple Superphosphate),
Or 1 pound 20-10-10 (Jonathan Green Turf Nutrition) plus 0.5 pound (8 ounces) 0-20-0 (Superphosphate) or 0.25 pound (4 ounces) 0-40-0 (Triple Superphosphate),
Or 1 pound 20-3-10 (Terre SuperLawn-Spur) plus 1 pound 0-20-0 (Superphosphate) or 0.5 pound (7 ounces) 0-40-0 (Triple Superphosphate)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate).

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply

using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4006

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: B1

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.35

Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

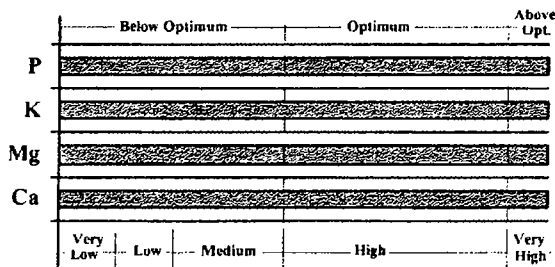
Phosphorus: 656 (Above Optimum)

Potassium: 941 (Above Optimum)

Magnesium: 1068 (Above Optimum)

Calcium: 19064 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
571 (High)

Copper:
68. (High)

Manganese:
96. (Adequate)

Boron:
8.6 (Adequate)

Iron:
101 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.88 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 9.62%

Loss On Ignition: Organic Matter = 9.72%, Organic Carbon = 5.64%

Mechanical Analysis: Sand = 77%, Silt = 14%, Clay = 9%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitro of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitro of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0.1 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

Manganese does not appear to be a limiting factor. Maintain soil pH in the optimum range, as directed in "Recommendations". See FS973 for more information about manganese in soil and plant nutrition.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4007

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: C1

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.35

Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

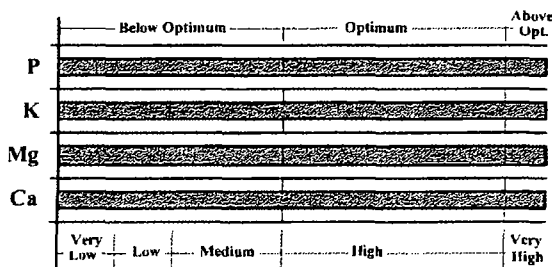
Phosphorus: 491 (Above Optimum)

Potassium: 1145 (Above Optimum)

Magnesium: 1922 (Above Optimum)

Calcium: 23763 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
563 (High)

Copper:
95. (High)

Manganese:
121 (High)

Boron:
7.4 (Adequate)

Iron:
114 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.17 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 8.56%

Loss On Ignition: Organic Matter = 10.34%, Organic Carbon = 5.99%

Mechanical Analysis: Sand = 75%, Silt = 19%, Clay = 6%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

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(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4008

Name: Lockheed Martin/REAC
Christopher D. Gussman
Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX

Sample ID: D1

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.35 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

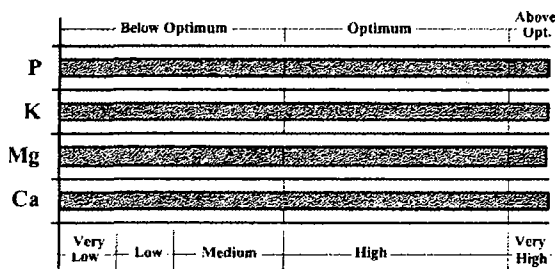
Phosphorus: 197 (Above Optimum)

Potassium: 541 (Above Optimum)

Magnesium: 324 (Above Optimum)

Calcium: 7570 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
499 (High)

Copper:
93. (High)

Manganese:
98. (Adequate)

Boron:
4.5 (Adequate)

Iron:
188 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 0.96 mmho/cm (Somewhat High soluble salt content -- may inhibit germination or 'burn' seedling roots)

Gravel Content: Larger Than 2mm = 7.23%

Loss On Ignition: Organic Matter = 4.24%, Organic Carbon = 2.46%

Mechanical Analysis: Sand = 84%, Silt = 8%, Clay = 8%, Texture = Loamy Sand

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitro of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitro of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

Manganese does not appear to be a limiting factor. Maintain soil pH in the optimum range, as directed in "Recommendations". See FS973 for more information about manganese in soil and plant nutrition.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Sandy material with woody coarse fragments. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

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(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
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Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4009

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
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Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: E1

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.10 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

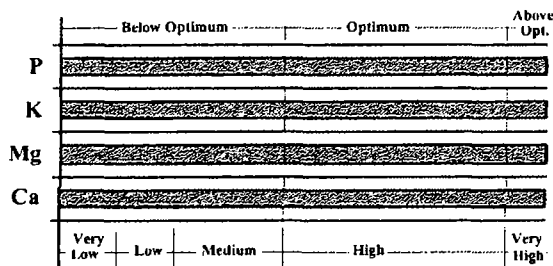
Phosphorus: 890 (Above Optimum)

Potassium: 1108 (Above Optimum)

Magnesium: 1068 (Above Optimum)

Calcium: 13407 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
503 (High)

Copper:
29. (High)

Manganese:
87. (Adequate)

Boron:
7.9 (Adequate)

Iron:
117 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.38 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 16.52%

Loss On Ignition: Organic Matter = 19.71%, Organic Carbon = 11.43%

Mechanical Analysis: Sand = 77%, Silt = 14%, Clay = 9%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a neutral soil. The pH is somewhat higher than the best range for the growth of most Lawn, Perennial but no correction should be made. Do not apply any limestone.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

Manganese does not appear to be a limiting factor. Maintain soil pH in the optimum range, as directed in "Recommendations". See FS973 for more information about manganese in soil and plant nutrition.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4010

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: A2

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.45 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

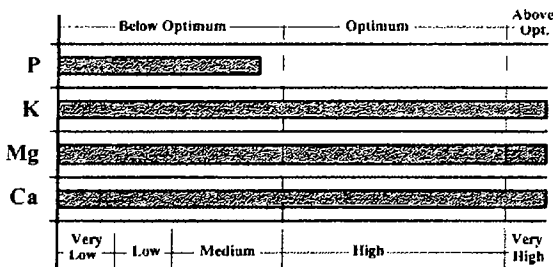
Phosphorus: 66 (Below Optimum)

Potassium: 364 (Above Optimum)

Magnesium: 1246 (Above Optimum)

Calcium: 21396 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
613 (High)

Copper:
27. (High)

Manganese:
275 (High)

Boron:
8.8 (Adequate)

Iron:
150 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.87 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 22.35%

Loss On Ignition: Organic Matter = 9.98%, Organic Carbon = 5.79%

Mechanical Analysis: Sand = 69%, Silt = 26%, Clay = 5%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate medium phosphorus (P) and very high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-1-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitro of Soda (Bonide)) plus 5 pounds 0-20-0 (Superphosphate) or 2.5 pounds 0-40-0 (Triple Superphosphate),

Or 3 pounds 31-0-0 (Greenview Winterizer) plus 5 pounds 0-20-0 (Superphosphate) or 2.5 pounds 0-40-0 (Triple Superphosphate)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate medium phosphorus (P) and very high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (2-1-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitro of Soda (Bonide)) plus 0.5 pound (8 ounces) 0-20-0 (Superphosphate) or 0.25 pound (4 ounces) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer) plus 0.5 pound (8 ounces) 0-20-0 (Superphosphate) or 0.25 pound (4 ounces) 0-40-0 (Triple Superphosphate)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet

for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4011

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: B2

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.40 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

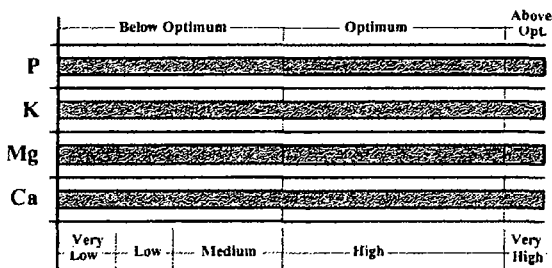
Phosphorus: 536 (Above Optimum)

Potassium: 965 (Above Optimum)

Magnesium: 1566 (Above Optimum)

Calcium: 21556 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
534 (High)

Copper:
31. (High)

Manganese:
287 (High)

Boron:
10. (Adequate)

Iron:
119 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.61 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 12.79%

Loss On Ignition: Organic Matter = 13.07%, Organic Carbon = 7.58%

Mechanical Analysis: Sand = 67%, Silt = 23%, Clay = 9%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4012

Name: Lockheed Martin/REAC
Christopher D. Gussman
Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: C2

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.40 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

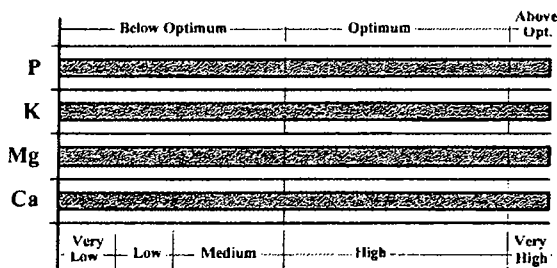
Phosphorus: 1288 (Above Optimum)

Potassium: 1349 (Above Optimum)

Magnesium: 1958 (Above Optimum)

Calcium: 22250 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
632 (High)

Copper:
4.0 (Adequate)

Manganese:
307 (High)

Boron:
11. (Adequate)

Iron:
36. (Low)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.80 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 18.48%

Loss On Ignition: Organic Matter = 39.33%, Organic Carbon = 22.81%

Mechanical Analysis: Sand = 82%, Silt = 3%, Clay = 15%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitro of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitro of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Deficiency of iron in soil usually results in interveinal chlorosis (pale green to yellow leaves -or bleached white in extreme cases- between darker green veins of affected plants). Acid-loving plants are especially vulnerable. Lime only as recommended because soil pH strongly affects iron availability. Avoid excess phosphorus or nitrogen fertilization. Amending the soil with organic matter, especially composted animal manure, is the best long-term solution. In fertilizers, chelated iron is preferred for soil application. Foliar application can be made with iron sulfate or chelated iron fertilizers. Carefully follow product instructions. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Highly organic sample, some decomposed and woody coarse fragments with fibrous mats. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4013

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: D2

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.60 Moderately alkaline, too high for growth of many plants and indicates either severe overliming or a salt-affected soil.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

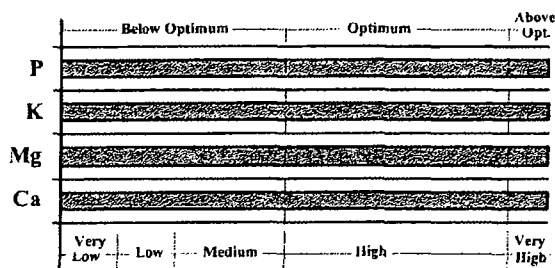
Phosphorus: 286 (Above Optimum)

Potassium: 1232 (Above Optimum)

Magnesium: 1566 (Above Optimum)

Calcium: 16000 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
502 (High)

Copper:
4.5 (Adequate)

Manganese:
246 (High)

Boron:
8.1 (Adequate)

Iron:
50. (Adequate)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.80 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 26.07%

Loss On Ignition: Organic Matter = 21.15%, Organic Carbon = 12.27%

Mechanical Analysis: Sand = 53%, Silt = 28%, Clay = 19%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a moderately alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost or wood ashes to the area. The pH may be reduced by the application of powdered sulfur, iron sulfate, or aluminum sulfate. One of these materials should be spread uniformly on the surface, then mixed thoroughly to a 6 inch depth by shovel or by tilling. The rates of application are:

sulfur : 3 pounds/1000 sq. ft.
Iron sulfate : 27 pounds/1000 sq. ft.
Aluminum sulfate : 24 pounds/1000 sq. ft.

Have the soil tested again in one year.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),
Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),
Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Iron should be sufficient as long as soil pH is in the optimum range for the plant being grown. The availability of iron to plants decreases as soil pH increases. Maintain soil pH in the recommended range to assure availability of iron to plant roots. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Highly organic sample, some decomposed and woody coarse fragments with fibrous mats. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4014

Name: Lockheed Martin/REAC
Christopher D. Gussman
Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: E2

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia
New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.50

Moderately alkaline, too high for growth of many plants and indicates either severe overliming or a salt-affected soil.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

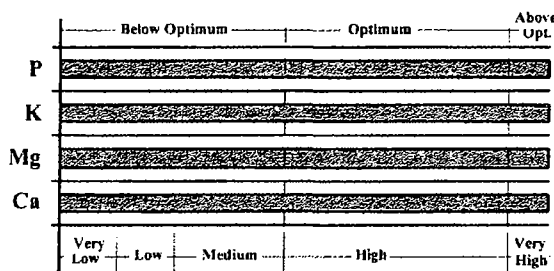
Phosphorus: 616 (Above Optimum)

Potassium: 1250 (Above Optimum)

Magnesium: 1068 (Above Optimum)

Calcium: 19010 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
552 (High)

Copper:
12. (Adequate)

Manganese:
293 (High)

Boron:
6.9 (Adequate)

Iron:
58. (Adequate)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.42 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 23.52%

Loss On Ignition: Organic Matter = 21.94%, Organic Carbon = 12.73%

Mechanical Analysis: Sand = 55%, Silt = 30%, Clay = 15%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Iron should be sufficient as long as soil pH is in the optimum range for the plant being grown. The availability of iron to plants decreases as soil pH increases. Maintain soil pH in the recommended range to assure availability of iron to plant roots. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Highly organic sample, some decomposed and woody coarse fragments with fibrous mats. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

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(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4015

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: A3

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.70

Moderately alkaline, too high for growth of many plants and indicates either severe overliming or a salt-affected soil.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

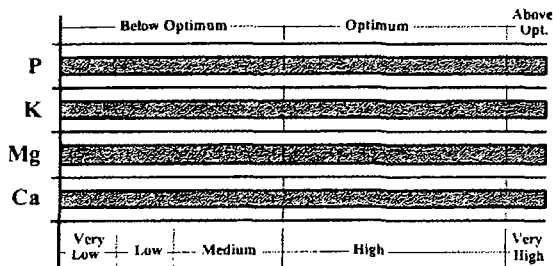
Phosphorus: 161 (Above Optimum)

Potassium: 354 (Above Optimum)

Magnesium: 1182 (Above Optimum)

Calcium: 21146 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
468 (High)

Copper:
18. (Adequate)

Manganese:
241 (High)

Boron:
9.1 (Adequate)

Iron:
90. (Adequate)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.60 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 12.81%

Loss On Ignition: Organic Matter = 12.03%, Organic Carbon = 6.98%

Mechanical Analysis: Sand = 71%, Silt = 21%, Clay = 8%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a moderately alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost or wood ashes to the area. The pH may be reduced by the application of powdered sulfur, iron sulfate, or aluminum sulfate. One of these materials should be spread uniformly on the surface, then mixed thoroughly to a 6 inch depth by shovel or by tilling. The rates of application are:

sulfur : 3 pounds/1000 sq. ft.
Iron sulfate : 27 pounds/1000 sq. ft.
Aluminum sulfate : 24 pounds/1000 sq. ft.

Have the soil tested again in one year.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),
Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),
Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Iron should be sufficient as long as soil pH is in the optimum range for the plant being grown. The availability of iron to plants decreases as soil pH increases. Maintain soil pH in the recommended range to assure availability of iron to plant roots. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4016

Name: Lockheed Martin/REAC
Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: B3

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia
New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.55 Moderately alkaline, too high for growth of many plants and indicates either severe overliming or a salt-affected soil.

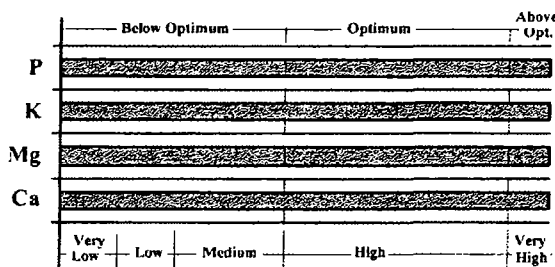
Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

Phosphorus: 380 (Above Optimum)
Potassium: 832 (Above Optimum)
Magnesium: 2172 (Above Optimum)
Calcium: 25650 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:	Copper:	Manganese:	Boron:	Iron:
612 (High)	60. (High)	266 (High)	6.3 (Adequate)	142 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 3.38 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 7.73%

Loss On Ignition: Organic Matter = 8.85%, Organic Carbon = 5.13%

Mechanical Analysis: Sand = 72%, Silt = 25%, Clay = 3%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a moderately alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost or wood ashes to the area. The pH may be reduced by the application of powdered sulfur, iron sulfate, or aluminum sulfate. One of these materials should be spread uniformly on the surface, then mixed thoroughly to a 6 inch depth by shovel or by tilling. The rates of application are:

sulfur : 3 pounds/1000 sq. ft.
Iron sulfate : 27 pounds/1000 sq. ft.
Aluminum sulfate : 24 pounds/1000 sq. ft.

Have the soil tested again in one year.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitro of Soda (Bonide)),
Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitro of Soda (Bonide)),
Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4017

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX

Sample ID: C3

Crop or Plant

New Lawn, Cool Season - Grass

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.00 Neutral, slightly high for the growth of most plants.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

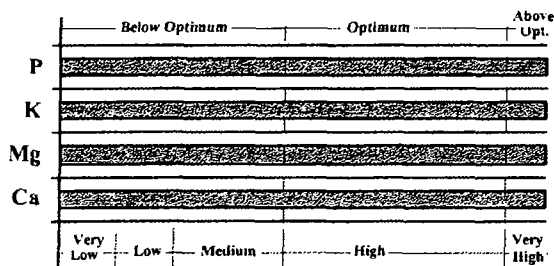
Phosphorus: 1198 (Above Optimum)

Potassium: 1199 (Above Optimum)

Magnesium: 1257 (Above Optimum)

Calcium: 23371 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
485 (High)

Copper:
29. (High)

Manganese:
148 (High)

Boron:
8.2 (Adequate)

Iron:
134 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.82 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 14.60%

Loss On Ignition: Organic Matter = 16.33%, Organic Carbon = 9.47%

Mechanical Analysis: Sand = 81%, Silt = 12%, Clay = 7%, Texture = Loamy Sand

Lime Recommendation

The soil test indicates a neutral soil. The pH is somewhat higher than the best range for the growth of most Lawn, Perennial but no correction should be made. Do not apply any limestone.

Fertilizer Recommendation

New Grass -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-1-1) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 10 pounds 10-10-10 (Scotts All Purpose Flower & Vegetable, Jonathan Green Balanced Feeding, Espoma, Agway),

Or 7 pounds 14-14-14 (Osmocote Vegetable&Bedding SmartRelease),

Or 6 pounds 17-17-17 (Sta-Green Flowering&Vegetable SlowRelease),

Or 5 pounds 19-19-19 (Jonathan Green Triple),

Or 5 pounds 20-20-20 (Peters AllPurpose (dry))

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers evenly over the surface and mix in to 6 inches before seeding. 2-4 weeks after emergence, apply 1/2-1 pound of N per 1000 square feet in a 2-1-1 grade.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4018

Name: Lockheed Martin/REAC
Christopher D. Gussman
Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: D3

Crop or Plant

New Lawn, Warm Season - Grass, Bermuda or Zoysia
New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.35 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

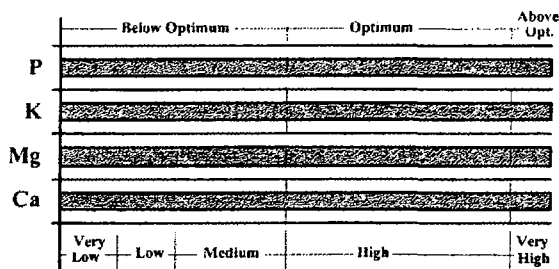
Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

Phosphorus: 377 (Above Optimum)
Potassium: 1038 (Above Optimum)
Magnesium: 1447 (Above Optimum)
Calcium: 19188 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc: 499 (High)	Copper: 28. (High)	Manganese: 188 (High)	Boron: 7.3 (Adequate)	Iron: 126 (High)
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Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.59 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 18.78%

Loss On Ignition: Organic Matter = 11.12%, Organic Carbon = 6.45%

Mechanical Analysis: Sand = 70%, Silt = 23%, Clay = 7%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass, Bermuda or Zoysia -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 6.5 pounds 15-0-0 (Nitre of Soda (Bonide)),

Or 3 pounds 31-0-0 (Greenview Winterizer)

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers in 1 application evenly over the soil before planting sprigs/cores in mid-May through June. Water to keep sprigs/cores moist during first 3 weeks. 4 weeks after planting, apply 1 pound of N per 1000 square feet in a 10-6-4 grade at a rate of 10 pounds per 1000 square feet, or 20-5-5 grade at a rate of 5 pounds per 1000 square feet. Repeat every six weeks until the end of August.

Warm season grasses require less water than cool season grasses. Water during the summer only if the grass takes on a grey-green or brown color. Maintain a low mowing height of 0.5" to 1.25" to favor the warm season grass.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),

Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Moist sandy material with significant amount of matted fibrous plant residue. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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Soil Science Society of America, North American Proficiency Testing Program





New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
Rutgers, The State University
P.O. Box 902
Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4019

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: E3

Crop or Plant

New Lawn, Cool Season - Grass

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.28 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).
It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

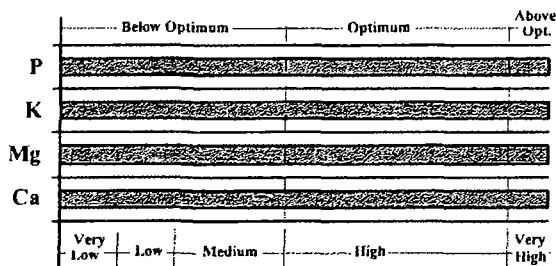
Phosphorus: 1092 (Above Optimum)

Potassium: 1264 (Above Optimum)

Magnesium: 1748 (Above Optimum)

Calcium: 21022 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
499 (High)

Copper:
5.4 (Adequate)

Manganese:
148 (High)

Boron:
9.7 (Adequate)

Iron:
50. (Adequate)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 2.88 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 27.02%

Loss On Ignition: Organic Matter = 36.40%, Organic Carbon = 21.11%

Mechanical Analysis: Sand = 73%, Silt = 20%, Clay = 7%, Texture = Sandy Loam

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-1-1) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 10 pounds 10-10-10 (Scotts All Purpose Flower & Vegetable, Jonathan Green Balanced Feeding, Espoma, Agway),
Or 7 pounds 14-14-14 (Osmocote Vegetable&Bedding SmartRelease),
Or 6 pounds 17-17-17 (Sta-Green Flowering&Vegetable SlowRelease),
Or 5 pounds 19-19-19 (Jonathan Green Triple),
Or 5 pounds 20-20-20 (Peters AllPurpose (dry))

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers evenly over the surface and mix in to 6 inches before seeding. 2-4 weeks after emergence, apply 1/2-1 pound of N per 1000 square feet in a 2-1-1 grade.

New Mixed Perennial -

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1 pound 15-0-0 (Nitre of Soda (Bonide)),
Or 0.5 pound (10 ounces) 31-0-0 (Greenview Winterizer)

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Iron should be sufficient as long as soil pH is in the optimum range for the plant being grown. The availability of iron to plants decreases as soil pH increases. Maintain soil pH in the recommended range to assure availability of iron to plant roots. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Highly organic sample, some decomposed and woody coarse fragments with fibrous mats. Material reported as % Gravel is not GRAVEL; it is coarse plant material.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

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New Jersey Agricultural
Experiment Station

Soil Testing Laboratory
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Milltown, NJ 08850-0902
Phone: (732) 932-9295

Soil Test Report

Lab No: 2009-4020

Name: Lockheed Martin/REAC

Christopher D. Gussman

Address: 2890 Woodbridge Ave, Bldg. 209 Annex
Edison, NJ 08837

Phone: (732) 321-4237

Fax: (732) 494-4021

Referred To: Rutgers Cooperative Ext. of Middlesex County
(732) 398-5262

Date Received: 06/02/2009

Date Reported: 06/17/2009

Serial No: MX -

Sample ID: A4

Crop or Plant

New Lawn, Cool Season - Grass

New Perennial - Mixed Perennial

Soil Tests and Interpretation

pH: 7.40 Very slightly alkaline, indicative of overliming. Possibility of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Lime Requirement Index:

Adams-Evans LRI is a measure of the soil's buffering capacity (resistance to change in pH).

It is used to determine liming rate, when necessary.

Macronutrients (pounds/acre)

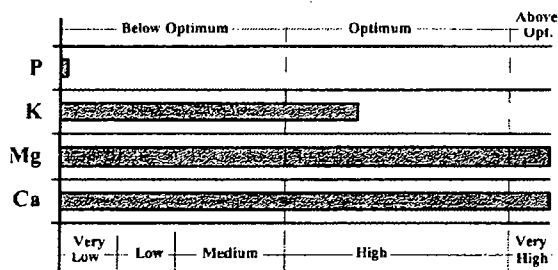
Phosphorus: 3 (Below Optimum)

Potassium: 190 (Optimum)

Magnesium: 1105 (Above Optimum)

Calcium: 17369 (Above Optimum)

by Mehlich 3 extraction



Micronutrients (parts per million)

Zinc:
715 (High)

Copper:
221 (High)

Manganese:
108 (High)

Boron:
3.4 (Adequate)

Iron:
398 (High)

Special Tests and Results

Electrical Conductivity: Soluble Salt Level = 1.98 mmho/cm (Very High soluble salt content; will 'burn' plant roots, causing drought-like symptoms)

Gravel Content: Larger Than 2mm = 1.15%

Loss On Ignition: Organic Matter = 2.07%, Organic Carbon = 1.20%

Mechanical Analysis: Sand = 75%, Silt = 21%, Clay = 4%, Texture = Loamy Sand

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn, Perennial. Do not apply any limestone, compost, or wood ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

New Grass -

The soil tests indicate very low phosphorus (P) and high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-5-2) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 9 pounds 11-40-6 (Sta-Green BloomStart Gran.) plus 3 pounds 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma)) or 2.5 pounds 0-0-60 (Muriate of Potash (Bonide)),

Or 5 pounds 0-20-0 (Superphosphate) plus 4 pounds 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma)) or 3 pounds 0-0-60 (Muriate of Potash (Bonide)),

Or 2.5 pounds 0-40-0 (Triple Superphosphate) plus 4 pounds 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma)) or 3 pounds 0-0-60 (Muriate of Potash (Bonide))

Spread the indicated amount of pounds/1000 square feet per application of one of these fertilizers evenly over the surface and mix in to 6 inches before seeding. 2-4 weeks after emergence, apply 1/2-1 pound of N per 1000 square feet in a 2-1-1 grade.

New Mixed Perennial -

The soil tests indicate very low phosphorus (P) and high potassium (K) fertility levels.

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (2-4-1) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 1.5 pounds 12-26-6 (Peters SeasonLong Super Blossom Booster),

Or 1 pound 18-27-5 (Schultz SupremeGreen Starter) plus 0.1 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma)) or 0.1 pound (1 ounce) 0-0-60 (Muriate of Potash (Bonide))

Apply the indicated amount of fertilizer per 100 square feet and mix thoroughly with the soil before planting.

While many perennials perform best with minimal fertilization, some perennials are heavy feeders, (for example, peony and chrysanthemum) and will perform better with a second application of fertilizer. In addition, sandy soil types and other soils where nitrogen has been leached by heavy rains will require a second application of fertilizer. This second fertilization should be applied at the rate of 0.1 pound of N per 100 square feet using a 4-1-1 grade (0.25 pound (5 ounces) 31-3-8 (Scotts LawnPro Step4) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 26-4-6 (TwinLight SuperTurf) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate)). Topdress the indicated amount of fertilizer about two weeks before bloom, at the midseason of the plant's growth. Do not fertilize after August 1.

When levels of phosphorus and potassium are medium to high, controlled release fertilizers may be used instead. Apply using a 3-1-2 grade (1 pound 12-4-8 (Scotts Rose & Bloom),

Or 0.5 pound (7 ounces) 22-0-14 (Vigoro UltraTurf PhosFree Winterizer) plus 0.1 pound (2 ounces) 0-20-0 (Superphosphate) or 0.1 pound (1 ounce) 0-40-0 (Triple Superphosphate),

Or 0.5 pound (7 ounces) 22-3-14 (Schultz SupremeGreen Winterizer, Scotts WinterGuard, Vigoro UltraTurf Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate) or a 4-1-2 grade (0.25 pound (6 ounces) 26-3-13 (Agway Greenlawn Winterizer) plus 0.1 pound (1 ounce) 0-20-0 (Superphosphate),

Or 0.25 pound (6 ounces) 25-6-8 (Jonathan Green Natural Vigor) plus 0 pound (1 ounce) 0-0-50 (Sulfate of Potash/Potassium Sulfate (Espoma))), as recommended by the manufacturer. Use the amount specified per 100 square feet for soils of high fertility, and up to twice the specified amount on soils of moderate fertility. Fertilizer granules should not be broken, as this would allow immediate release of the fertilizer salts and may burn plant roots. Controlled release fertilizers eliminate the need for a second application of fertilizer.

Micronutrient Statements

Zinc toxicity is possibility for certain types of plants. If soil pH is lower (more acidic) than optimum, lime as recommended below. Establish or maintain optimum phosphorus level in soil. If soil organic matter is low, soil amendment with leaf compost can immobilize as well as dilute the soil zinc concentration. See FS721 for more information about soil zinc.

To reduce availability of soil copper to plants, lime the soil to the appropriate pH level (if needed) and amend the soil with organic matter. For more information about copper in soil and plant nutrition, see FS720.

In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Boron would not be a limiting factor for most plants. Plant types differ in their requirement for boron, however; certain fruit, vegetables, and field crops have greater need for boron (up to 0.75 ppm). For more information, see FS873.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments

VISUAL ASSESSMENT: Sandy material with aggregates of finer textured material and few coarse fragments.

Please refer questions to: Rutgers Cooperative Extension of Middlesex County
(732) 398-5262

Visit the New Jersey Agricultural Experiment Station website at www.njaes.rutgers.edu

Soil Science Society of America, North American Proficiency Testing Program



RUTGERSNew Jersey Agricultural
Experiment StationSoil Testing Laboratory
ASB-II, Room 152
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Rutgers, The State University of New Jersey
57 US Highway 1
New Brunswick, NJ 08901soiltest@aesop.rutgers.edu
http://njaes.rutgers.edu/services732-932-9295, Ext. 4231
Fax: 732-932-9292**Compost Test Report**

Lab No: 2009 - 4004

Name: Christopher D. Gussman
Lockheed Martin/REAC
Address: 2890 Woodbridge Ave. Bldg. 209 Annex
Edison, NJ 08837
Phone: (732) 321-4237
Fax: (732) 494-4021

Date Received: 06/02/2009

Date Reported: 06/22/2009

FAXED

Sample ID: Organic Leaf Compost

Crop or Plant**Compost Tests and Interpretation**

Visual Assessment	Sticky dark brown organic material, with 65% wood bulking agent by volume.			
Moisture content, as received	41	% water , wet basis	59	% solids
			Interpretation/Comment	
pH of saturated media extract	7.20		Nar neutral; expected pH for cured compost	
Soluble Salt Level of saturated media extract	2.20	mmho/cm	Optimum for organic media	
Inorganic Nitrogen in saturated media extract	0	ppm Nitrate-N	Low	
	1	ppm Ammonium-N	Low	
Organic Matter Content	18.0	%		
Organic Carbon Content	10.4	%		
Total Kjeldahl Nitrogen	0.31	%		
Carbon-to-Nitrogen Ratio	34	:1	High; risk of N deficiency during ongoing decomposition	
Maturity Index	6, Active Compost, curing; reduced management requirements. Suitable maturity for soil amendment.			

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Fax: (732) 494-4021Date Received: 06/02/2009
Date Reported: 06/22/2009

Sample ID: Organic B.S.

Crop or Plant**Compost Tests and Interpretation**

Visual Assessment	Dark brown organic material with >50% woody bulking agent by volume.			
Moisture content, as received	49	% water, wet basis	51	% solids
			Interpretation/Comment	
pH of saturated media extract	5.70		Very acidic for compost; suggesting anaerobic conditions during composting	
Soluble Salt Level of saturated media extract	10.81	mmho/cm	Very High; may cause salt damage ("burn") to plants; salts will leach over time with rainfall if exposed	
Inorganic Nitrogen in saturated media extract	1127	ppm Nitrate-N	Extremely High	
	85	ppm Ammonium-N	Very High	
Organic Matter Content	58.9	%		
Organic Carbon Content	34.1	%		
Total Kjeldahl Nitrogen	1.68	%		
Carbon-to-Nitrogen Ratio	20	:1	Good; indicates adequate organic nitrogen to plants during long-term compost decomposition	
Maturity Index	6, Active Compost, curing; reduced management requirements. Suitable maturity for soil amendment.			